# Smithsonian

*November 1983*

The return of the mule: five-month-old blond sorrels in Kentucky (p.98)

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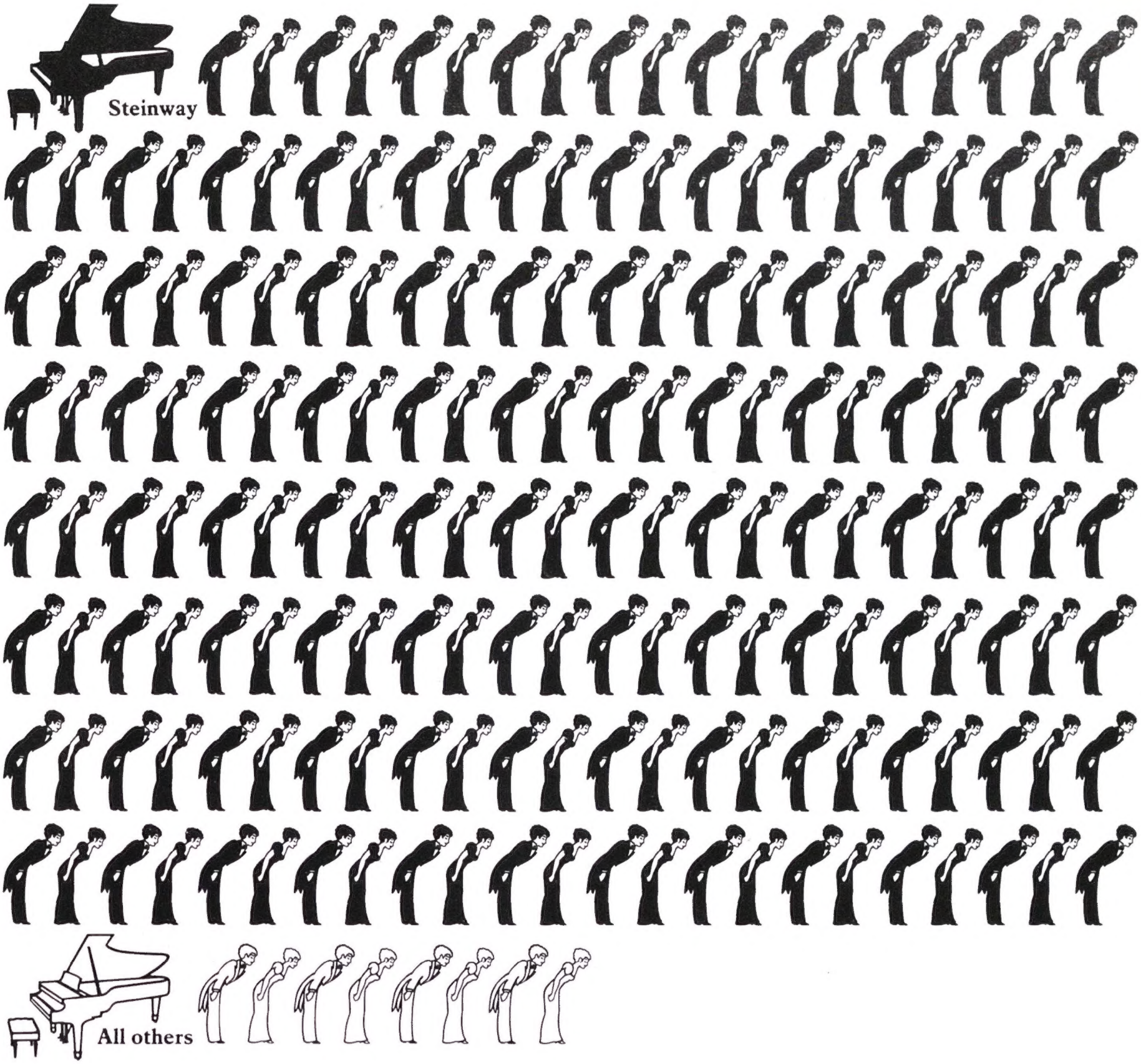


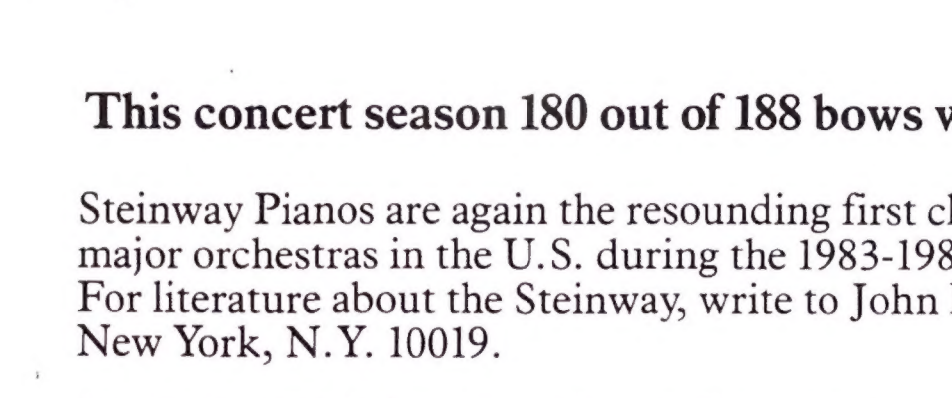


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STEUBEN GLASS

*November 1983*

# Smithsonian

Volume 14, Number 8

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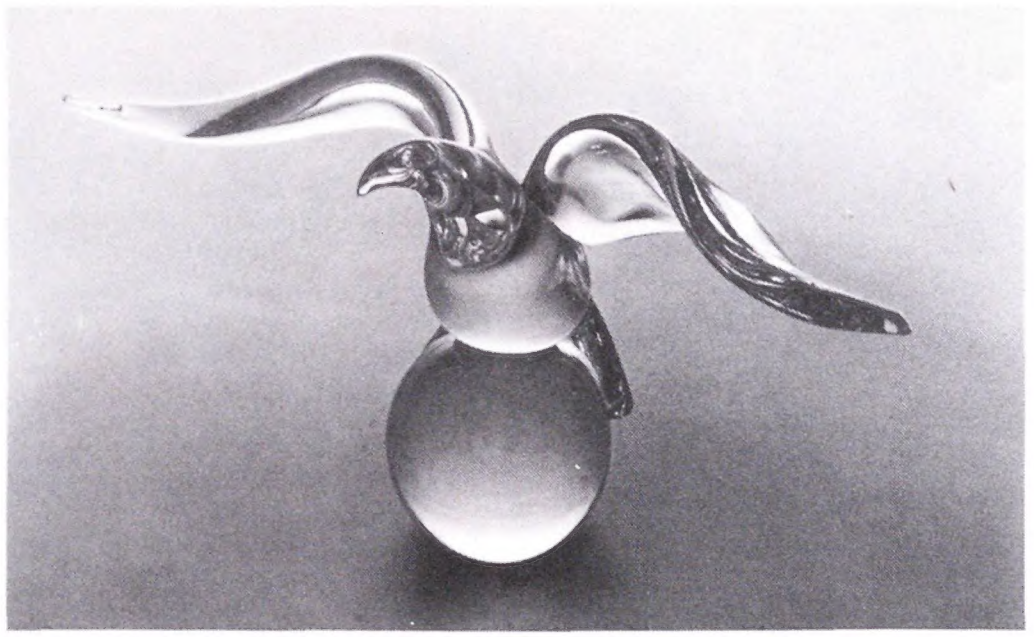

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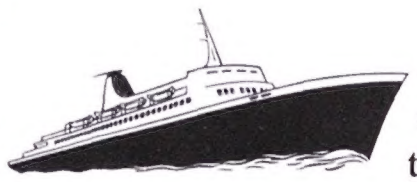

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# *The view from the castle*

*For a country that has changed as little as has Bhutan, 200-year-old accounts of travel there seem as contemporary as newspapers*

A letter has come from Bhutan—a rare event, and thus all the more noteworthy. It reminds me of November and the border region in the northwest of that country. Fifteen years ago, and again ten years later, we walked or rode yaks through the rain between 11,000 and 14,000 feet above sea level, and above that through flurries of snow and heavy fog. One day we came out of the mist to a flat place at about 15,000 feet, and our companion, the letter writer, said that we should camp there. It was the king's campsite, he said, and we had his permission to use it.

We put up our tents in a steady drizzle, which finally tapered off to mist again. A very tall, impressive figure appeared out of the gloom, the Ramjam of Lingshi Dzong, a local official from the nearby border fort. He was accompanied by a huge, gamboling Saint Bernard, property of His Majesty the King of Bhutan, and, like the yaks, a creature who preferred the high altitudes. Hot tea, yak milk, crackers and dried beef were produced, but we were too tired to do much more than smile gratefully, sip the liquids and watch while the yaks were tethered.

We slept fitfully, waking up to wonder where we were. But the next morning there was no mistaking. The sun was up and the mist had vanished, only a few skeins wreathing the lower slopes. Straight ahead of us reared an immense, perfect pyramid of ice and snow, the sun full on it and the clear blue sky outlining the sparkling crystal shape, painfully bright. It was, it could only be, Chomo Lhari, the "Snow Queen," 23,997 feet high. On a lower ridge flanking our little plateau we could see a small group of sheep, the wild blue sheep of the high Himalayas. Nearer, a pair of bearded vultures—lammergeiers—wheeled majestically on nine-foot wings.

In September of 1783, 200 years ago, Capt. Samuel Turner passed this place on a mission from the Governor General of Bengal, Warren Hastings. He was on his way to the court of the infant Teshoo Lama in Tibet. In his account of the journey, *The Court of the Teshoo Lama* (the full title is much longer), he describes the snow-covered mountains we were looking at: "The most conspicuous is that called Chumularee which lifts itself above the rest [and] is highly venerated by the Hindoos [who attach] superior sanctity . . . to this mountain."

Turner says of the yak, or "the bushy-tailed bull of Tibet," as he termed it: "They have a downcast heavy look; and appear, what indeed they are, sullen and suspicious, discovering much impatience at the near approach of strangers. They . . . make a low grunting noise scarcely audible, and that but seldom, when under some impression of uneasiness."

And so the receipt of a letter takes me back 200 years to Captain Turner and his colleague, Lt. Samuel Davis, whose diary and drawings are contained in a book published jointly by Serindia Publications, London, and the Smithsonian Institution Press. These books seem to the occasional traveler to an unknown land as contemporary as any newspaper. Reading them, I am back on the slopes where, in the bitter mist or brilliant sunshine, I can still hear the low, panting grunts of our wild long-haired friends, the yaks.

S. Dillon Ripley

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# *Letters to the Editor*

## *Saudi Arabian archaeology*

Dear Sir: Readers of your September issue might be interested in the most recent results of the work on the mound at Thaj, which was completed after your article had been prepared. When the mound was excavated there was no evidence of any metalworking activity; the slag on the surface did not seem to have any relationship to what we found beneath. What we did find were the remains of a monumental building with walls almost five feet thick; further excavation will be required to determine its use.

*Dr. Daniel Potts*
Institute of Near Eastern Archaeology
Free University of Berlin

Dear Sir: No depiction of the ruins at Mada'in Saleh would be complete without brief mention of Charles Montagu Doughty. In the 1870s Doughty, an Englishman, traveled with a caravan of Muslims on their pilgrimage to the holy city of Mecca, through territory that was forbidden to Christians. He endured the stifling heat of the Arabian desert and suffered from starvation, thirst and disease.

Wayne Eastep's cover photograph reflects the awe and wonder Doughty must have felt when, on December 14, 1876, he became the first Westerner to gaze upon the fabled ruins.

*Gary D. Kurz*
Enid, Oklahoma

## *Metropolitan Opera*

Dear Sir: Your article stirred memories of the old South Atlantic Music Festival, held in Spartanburg, South Carolina. In an annual season of opera in concert form, we heard some of those glorious voices until the Depression did away with our festival.

Schumann-Heink looked like a plump, good-natured hausfrau until she opened her mouth and that rich voice poured out. There is a tale that she was suspended above the stage, along with two other singers, during an angelic trio in *Elijah*, and when the mechanism failed to lower them she is said to have exclaimed: "Flying!—and me the mother of nine!"

*Robina Bagwell*
Spartanburg

Dear Sir: I, too, had a brief encounter with Maria Jeritza. In 1969, a freshman in medical school at Tulane, I slipped away from the anatomy laboratory one evening to attend a revival of Verdi's *Attila* by the New Orleans Opera Company. I had heard that Madame Jeritza would attend, and from the balcony I recognized her. After the performance I went downstairs to greet her, and she graciously gave me her autograph.

Then, last year in Brussels, I read of her death the day before I went to Bruges, the setting of Korngold's *Die tote Stadt*, in which she made her debut at the Met in 1921.

*R. W. Culver, M.D.*
Metairie, Louisiana

Dear Sir: How could you have left out of your mention of the old-time singers Adelina Patti and Luisa Tetrazzini? And Giovanni Martinelli, in all the years the closest voice to that of Caruso?

During the 1940s, when I listened to the Saturday afternoon Metropolitan Opera broadcasts, I can recall the famous "Bell Song" in *Lakmé* and the Lucia of the day, that diminutive lady with the clear, piercing voice—a voice that could reach untold heights—the voice of Lily Pons. Others of her era who deserve notice are Bruna Castagna, Kerstin Thorborg, Martial Singher, Salvatore Baccaloni, Grace Moore, Rose Bampton, Eleanor Steber, Patrice Munsel, Nino Martini and, later, Ferruccio Tagliavini.

*Albert E. Viserta*
Port Jervis, New York

Dear Sir: Rosa Ponselle's prima donna behavior was chronicled in painful detail by a frustrated account executive of N. W. Ayer & Son advertising agency, in a blow-by-blow, confidential account of ar-

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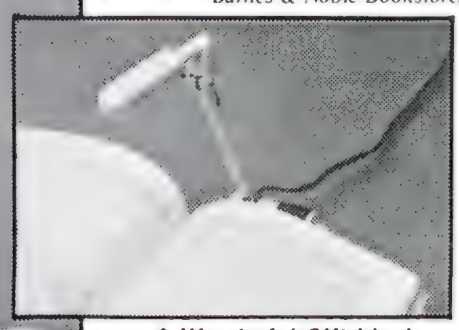

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ranging her appearance as guest artist on the *Ford Sunday Evening Hour* in 1936.

It began with a programming stalemate. Miss Ponselle objected to Ossip Gabrilowitsch's selection of numbers that she felt failed to show off her talents to best advantage. She refused to sing them or to rehearse with the Detroit Symphony until her preferences had been substituted. Ayer's Robert Pease had the impossible task of reconciling those two artistic egos.

Next was the equally imposing task of asking Henry Ford, who steadfastly refused to pose for publicity shots at any time, anywhere, with anyone, to pose with Miss Ponselle—who insisted on this concession as a condition for her continuing as guest artist. When Mr. Ford set the time for photos at 11 A.M., Miss Ponselle fired back that she never got out of bed before 1 P.M.!

All problems were resolved somehow and the program did go on the air as scheduled—with a completely wrung-out account executive and a triumphant diva.
*Norman Williamson jr.*
Claremont, California

Dear Sir: Your article evoked memories of the Old Met in the late 1940s and early '50s when, as students, we could afford only the $2 standing-room tickets. Midway through a performance, people with seats in the most desirable sections would give us standees their tickets as they rushed off to some other function. This thoughtful gesture generated enormous gratitude.

Now, many years and many miles removed from those youthful discoveries of grand opera's glories, we continue our association with the Metropolitan through our fine local classical-music station, KXTR, which brings opera on the air into America's heartland.
*Eleanor Nancy Scherer*
Olathe, Kansas

## *Treaty of Paris*

Dear Sir: I take issue with your September article's premise that, with the signing of the Treaty of Paris, America officially became a nation.

On June 7, 1776, Richard Henry Lee of Virginia moved, in the Second Continental Congress, "That these united Colonies are, and of right ought to be, free and Independent States." Note that he said "are," not "subject to Britain's ap-

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proval." The motion was tabled and John Adams, Franklin, Jefferson, Roger Sherman and Robert Livingston were delegated to draft the Declaration of Independence.

On July 2 the Congress adopted Lee's motion, and the instant the gavel of the Congress' president, John Hancock, hit his desk America was born, officially.

Two days later, on a date that we now celebrate as our Independence Day, the Congress debated, modified and adopted the Declaration and then ordered its publication.

America's action on July 2, 1776, was very properly unilateral, and the Treaty of Paris acknowledged an existing fact.
*Douglas McCabe*, USAF Reserve (ret.)
Fort Lauderdale
*To declare is not to achieve. A baby exists when it is born; with a country, the birth must be recognized. The Confederate States, among many other aspiring nations, declared independence—but did not achieve it.* Ed.

Dear Sir: You mixed up, on page 56, Henry Laurens and Franklin's grandson, who was secretary to the Commission. The lineup should read, from left, Jay, Adams, Franklin, Laurens, William Temple Franklin.
*Marcus Cunliffe*
Washington, D.C.
*There are times when too many editors spoil the broth.* Ed.

Dear Sir: Although the red line on the Mitchell map defined the boundaries of the new nation, one wrong two-letter word can make quite a difference. The caption under the map should read: "The Colonies acquired all of the land west *to* [not *of*] the Mississippi. . . ."
*Arthur Bestor*
Professor of History, Emeritus
Seattle
*Professor Bestor is correct. A typesetter's error was not caught.* Ed.

Dear Sir: The image of George III on page 57 is reversed.
*Ken Yellis*
National Portrait Gallery
Washington, D.C.

## *Bird's nest soup*

Dear Sir: I thought "collectors" were people who collected things to preserve, restore and pass on to the future.

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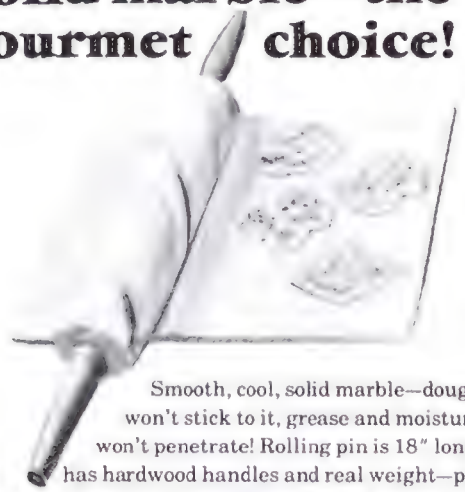

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It appears to this reader that nature, in a short span and in its own beautiful way, creates, while on the rungs of a ladder, Man climbs to destroy.
*Gerald Collins*
Wolf Point, Montana

## *The Bible according to Jefferson*

Dear Sir: Labeling the diety of the Jewish Bible as "wrathful" as compared to the "benevolence" of the Christian God should have been discarded along with all the other religious bigotries that the Age of Reason sought to eliminate.

What a pity that a man possessed of such immense and unique talents as Jefferson should have so completely misunderstood the loving and forgiving God of the Jews. Oh, well, no one's perfect.
*Leah Ben-Yehuda*
Butler, Pennsylvania

Dear Sir: On Judgment Day, Mr. Thomas Jefferson will have to stand with all those who, throughout history, have desecrated the Bible, for the Lord Himself warns us most emphatically: "If any man shall add unto these things God shall add unto him the plagues that are written in this book: And if any man shall take away from the words of the book . . . God shall take away his part out of the book of life . . ." (*Revelations* 22:18, 19).
*Helen A. Lett*
Bellevue, Washington

Dear Sir: Your article was a breath of fresh air. We cannot be reminded too often how radically different were our Founding Fathers' views of religion from those of our 20th-century religious propagandists. Just try to imagine *any* contemporary American politician compiling an edited version of the Bible, let alone one cutting out whatever "contravened the laws of nature."
*Maurice Bruce Stewart*
Salem, Oregon

Dear Sir: Jefferson was many things—agnostic, a "doubting Thomas," a deist, but not an atheist. It was to God, and not to Moses, Christ or Mohammed that Jefferson referred and prayed in his Inaugural Addresses, two of his Annual Messages, his Virginia Bill for Establishing Religious Freedom, and the Declaration of Independence.
*Mrs. Elizabeth Weddington*
New York City


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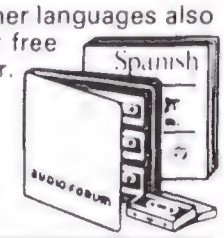


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*Snorers!*

Dear Sir: As a physician who does surgery for snoring, I applaud the journalist who helps to increase the public's awareness of this distressing disorder. Unfortunately, it seems an irresistible temptation to poke fun at snorers, even though snoring is often a true medical disease with serious health consequences. Snorers also become the object of ridicule, and snoring is disruptive to family life, leading to sleepless nights and resentfulness in other family members. Snorers are unwelcome roommates on vacations and business trips.

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*David N. F. Fairbanks, M.D.*
Washington, D.C.

Dear Sir: I suffered through 40 years of my husband's nightly serenades—tensely. I awaited the first snort, and of course it came and I'd be awake for hours. Finally, when I could bear no more, I decided to go off on another tack. I pretended the snoring sounded beautiful—and so it did. I never again heard him snore, and there were no more sleepless nights. "Mind over matter" worked like a charm. Much cheaper than surgery, and no aftereffects.

*Roslyn L. Pearson*
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Smithsonian mace, symbol of Institution, will appear on the cover of a new book.

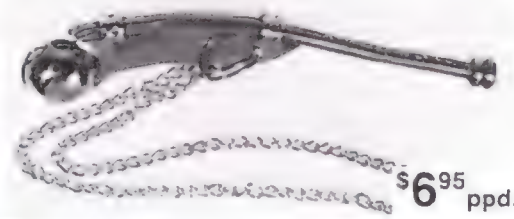
I am in this stage at last, having been off to the wars for many months, battling to write some good stuff about the Institution for *Treasures of the Smithsonian*, just published by Smithsonian Books. Like every returned soldier, I find that things have changed since I've been away at the front. I have trouble remembering my wife's name, get lost on the way to the market and discover changes at the Smithsonian that leave me as far behind as the guy who got back from World War II, entered a bar, ordered a beer and slapped a dime on the counter.

"You can't get a beer for a dime," the bartender told him.

"Forget it, then," said the veteran. "I never could stand that nickel stuff."

What I mean is, I was only dimly aware of the Smithsonian inventory everyone's talking about—a five-year effort to count every specimen, artifact and artwork in the Institution. Nobody sent me any cards or letters about it while I was in action—a real oversight because there is nothing like a good inventory to make a person the life of the party. When people ask us how many objects there are in the Smithsonian we can now answer, airily, "Oh, about a hundred million." That's a lot more effective socially than, "Golly, I haven't the faintest clue," which was all most of us could do until saved by the inventory. A letter came in recently asking if it's true that if you spent a minute with every item in the Smithsonian, it


# BOSUN'S CALL

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by

Roger Tory Peterson

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*Vase shown smaller than actual size of 11" high.*

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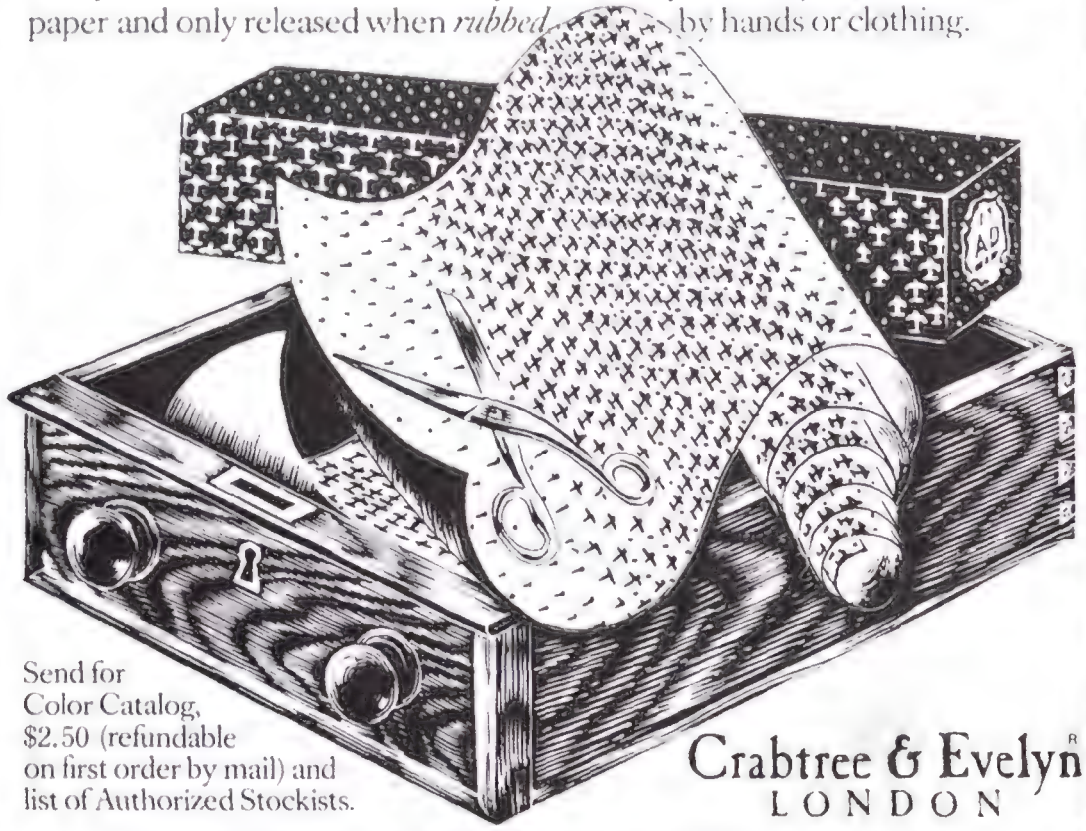

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would take you 80 years to get through the lot. Now that we have an inventory, I can provide the answer:

If you spent a minute on each item, putting in regular 40-hour weeks with a two-week vacation (which I think you'd need), you'd be at it for 833 years and four months. But that would mean spending a full minute staring at each of 114,429 bird eggs, among other things—a passion that most people don't share.

Let's presume that you content yourself merely with what's on display, not with what's in those endless rows of drawers and storage chests in (especially) the Museum of Natural History and the new storage facility in Suitland, Maryland (see this column for last May). Figuring about two million objects on display—that number varies—you'd put in 16 years and about eight months, a career that might well deserve a modest pension at the end.

Let's be more practical, and simply take one museum. Suppose you are a New Yorker and a student of design. You determine to look through the collections of the Cooper-Hewitt. Now you've got a feasible project, but even so you're using up something like a year and four months. Also, you're in danger of vastly increasing this period of time because of the staff elevator. You will be at its mercy, and it has notoriously little. The Cooper-

Museum technician Susan Schreiber at inventory, Museum of American History.

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Hewitt's inventory total is much higher than that of the next-most-item-filled art- and/or-design museum, the Museum of American Art, which contains 30,418 works. The Museum of African Art has 6,124 articles, but that's not counting the huge Eliot Elisofon collection of about 68,000 slides and photographs.

The National Air and Space Museum only counts some 360 air- and spacecraft, but its total collection, with all the books and pictures and awards and gadgets, is close to 29,000. Skylab is probably the largest item of all Smithsonian objects on exhibit. Old 1401, the Southern Railway locomotive, is the heaviest piece on display, since it weighs about 280 tons. It's one of six locomotives in the collection of the Museum of American History, which, incidentally, claims a huge total of items: 16 million, most of which are postage and revenue stamps.

As for the smallest things on display, there are tiny gems that are parts of larger jewelry, and there are doll-house miniatures. There are almost microscopic insects and very small fossils at Natural History. And there are the fly-powered planes at Air and Space. A storm of flak was aimed at me when I wrote about them in this column a few years ago, and I promised never again to mention them lest I again endure the wrath of all the nation's vociferous fly lovers. Well, this is *absolutely* the last time.

Aside from the inventory, another set of figures to chew on has to do with food at the National Zoo. Close to three tons of fresh fruit are dished out to the inhabitants every month, along with lots of less tempting entrées: rats, mice, live goldfish, mealworms and 92,000 (count 'em) crickets. The Zoo has a population of about 2,500—roughly the figure I remember for the New Hampshire town where I did much of my growing up.

And that reminds me of a strange story I heard during a reunion with New Hampshire friends and relatives. It's the sort of story my father's friend Slocum would have told (suitably embellished with insufferable homilies), and it involves a New Hampshire character whom I shall call Son of Slocum, not that he is.

On a day last summer, a car full of local people was nearing the very small and remote hillside village where they did their shopping. Son of Slocum—a grizzled veteran of many winters in the pine

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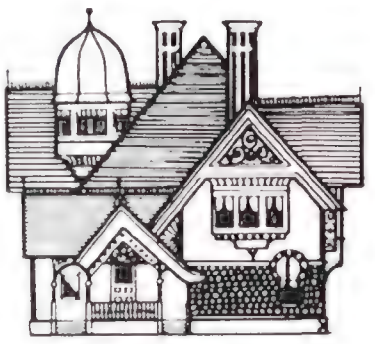

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woods—was in back. Suddenly an enormous animal, ten feet from nose whiskers to tail tip, leapt from a ledge, cleared the road and was gone down the mountain.

Nobody said a word. The driver continued to the village store, shut off the engine and turned around.

"Anybody else see that?" he asked as casually as he could.

All nodded, each with private relief that he wasn't the only one.

The driver looked at Son of Slocum, who was opening the back door to get out—as though nothing had happened. "You, too?" he asked.

S. of S. simply shrugged. "Catamount," he said. "I seen 'em lotsa times." And he went off to buy some baked beans.

I told this to our natural history editor, my old friend Jack Wiley. "Do you believe it really *was* a mountain lion, right there in northern New England?" I asked.

"Sure, I believe it," said Jack. Then he paused for a moment. "I *want* to believe it," he added.

So do I. And so do we all.

*Edwards Park*

*Picture credits*

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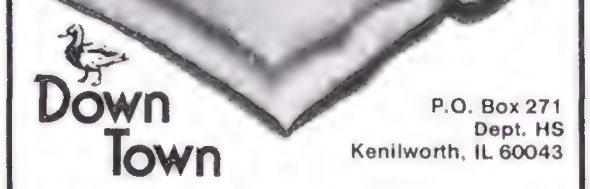

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# *Phenomena, comment and notes*

*Laboratory scientists are finding some nasty things in our food—and clues to thwarting cancer and heart disease*

By the time laboratory mice are two to three years old, some 30 percent of them will have cancer. For human beings the same percentage holds true at about 85 years. We are beginning to understand better why we humans live so much longer than mice, or our own prosimian ancestors, for that matter. We are beginning to understand why the onset of cancer is delayed in humans, that is to say why 30 percent of us do not contract cancer by the time we are three years old. And this same understanding carries over into heart and other degenerative diseases and even aging itself. It all has to do with nutrition and biochemistry, the food we eat and what it does to us.

A progress report, carefully qualified but full of promise for the future, was offered in the September 23 issue of *Science* by Bruce N. Ames, chairman of the biochemistry department at the University of California, Berkeley. Ames is concerned with laboratory determinations of an "extraordinary variety" of mutagens (substances that cause mutation) and both possible carcinogens (substances that cause cancer) and anticarcinogens in our food in its natural state as well as when it's cooked.

Part of it can be read as the stuff of the scare stories we have all tired of: Ames offers a long list of substances we eat all the time that appear to be mutagenic, carcinogenic or both. He then lists—and this is the stuff of headlines in supermarket tabloids—others that are anticar-

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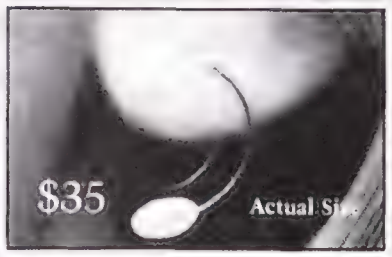


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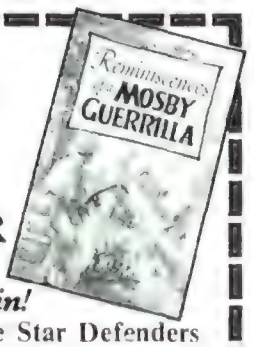


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cinogens. The real news, however, is that we are beginning to see clearly how both kinds of things work in the body.

The philosopher Pythagoras, Ames points out, forbade his followers to eat fava beans. Pythagoras presumably knew that if they did eat the beans, they might develop severe anemia. Today we know why. Millions of people in the Mediterranean region are deficient in a certain enzyme, a condition that increases their resistance to malaria but makes them markedly sensitive to the toxins naturally present in fava beans. We can follow the breakdown of the fava-bean toxins into forms that generate oxygen radicals. These last are worth understanding, because they appear to be a mechanism through which many of the mutagens and carcinogens do their dirty work.

Oxygen radicals are nothing more than molecules—containing oxygen—that have an extra electron. They are highly reactive: they just ache to combine with something else. Inside the body that something else is often our DNA, the genetic material that directs all activity at the level of the cell. When the oxygen radical bonds to the DNA, its chemistry and function changes. In most cases the damage is repaired, but not always. Some scientists now suspect that oxygen radicals are a key not only to much cancer, but also heart and other degenerative diseases. Many of the anticarcinogens in our food turn out to be antioxidants, chemicals that mop up loose oxygen radicals before they can do their damage.

While biochemists are nailing down how carcinogens work, epidemiologists look at maps of the world, maps that show how the rates of major types of cancer vary from country to country. In one country there is a high incidence of stomach cancer. In another, stomach cancer is rare but breast cancer is all too common. These differences lead scientists to hope that all major types of cancer are avoidable: if we can discover what it is that people in country A do that people in country B do not, we may have the answer as to why so many people in A develop stomach cancer. With lung cancer, the answer is smoking. For the rest, it makes sense to look first at diet. We are learning, after all, that many foods are loaded with carcinogens, and it is the foods that vary so clearly from one country to the next.

"Nature is not benign," Ames points

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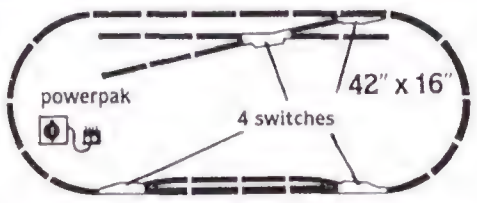


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out. Many plants produce large amounts of toxic chemicals as a defense against predators. Mushrooms, commercial and wild, are loaded. So are alfalfa sprouts. Potatoes contain toxic glycoalkaloids; chocolate contains theobromine, a relative of caffeine, which not only facilitates DNA damage by carcinogens in human cells, but also causes testicular atrophy and spermatogenic cell abnormalities in rats. All in all, the human intake of "nature's pesticides" can be several grams a day, Ames concludes, "probably at least 10,000 times higher than the dietary intake of man-made pesticides."

Some foods are a special case all by themselves. Alcohol, Ames writes, has long been associated with cancer of the mouth, esophagus, pharynx and larynx. Nitrates, naturally present in beets, celery, lettuce, spinach, radishes and rhubarb, are suspect in a number of human cancers. Even more important are the fats. Epidemiologic studies suggest, but do not prove, that high fat intake is associated with colon and breast cancer, Ames says. Animal studies show that high dietary fat at least promotes cancer and is a "presumptive carcinogen." Ames postulates that high fat could be deleterious because of rancidity and other such oxidative processes.

We humans add to the problem of natural toxins by cooking our foods. The burned and browned materials from heating protein are "highly mutagenic" and can cause cancer in rodents. Reaction products from caramelization of sugars during cooking (in bread crusts and toast, for example) contain a large variety of DNA-damaging agents and presumptive carcinogens. The total amount of such material in the human diet, Ames points out, may be several times the amount of burned material inhaled by a smoker using two packs a day. Smokers have more easily detectable levels of mutagens in their urine than nonsmokers, but so do people who have eaten a meal of fried pork or bacon.

Coffee combines several risks. It, too, contains burned material (from the roasting of the beans) including known mutagens. A cup of coffee also contains about 250 milligrams of the natural mutagen chlorogenic acid, toxic atractylosides and about 100 milligrams of caffeine, which inhibits DNA repair and can increase tumor yield. Ames cites prelimi-


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A L A S K A

nary, but not conclusive, evidence that heavy coffee drinking is associated with cancer of the ovary, bladder, pancreas and large bowel.

But then comes the good news. Our own bodies produce oxygen radicals, both in normal metabolism and in the course of fighting infections. So our bodies also produce a number of enzymes that protect cells from oxidative damage. There are also a number of antioxidants in our diet that the body requires for these antioxidative mechanisms. These, Ames states, "appear to be anticarcinogens."

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Carotenoids, substances present in green and yellow vegetables, are antioxidants that have been shown to be anticarcinogens in both rats and mice and may well be the same for humans. There is some recent evidence that smokers, especially, are protected by carotenoids.

Other important anticarcinogens in our diet include selenium (although this can be toxic in high doses) and uric acid (too much, however, causes gout). A low uric-acid level in blood may be a risk factor for cigarette-caused lung cancer.

Ascorbic acid, otherwise known as Vitamin C and the center of controversies as to its efficacy against everything from the common cold on up, is in fact anticarcinogenic in rats exposed to several cancer-causing agents.

We are learning, in effect, that some of what we eat appears to cause cancer, at least in part through damaging oxidation of our DNA, and that other things we eat prevent cancer by preventing that same oxidation. These antioxidants may well do a lot more for us, too. The same oxidative processes implicated in cancer may contribute to heart disease as well. Atherosclerosis, scientists postulate, begins from single cells and results in growths similar to benign tumors. Fat in the diet appears to be a major risk factor, and lesions resembling those of atherosclerosis have been produced in rabbits by injecting them with oxidized cholesterol.

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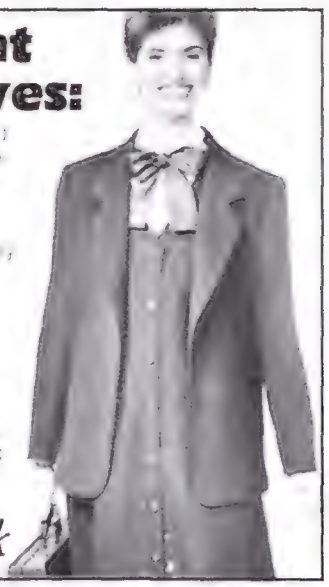

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The anticarcinogens he has discussed, Ames writes, "could be antiheart disease agents as well."

And that is not all. Oxidative processes may be involved in degenerative afflictions of the brain, including senile dementia, and several inherited progressive diseases of the central nervous system. Senile cataracts have been associated with light-induced oxidative damage. Presumably antioxidants would help defend against these and other ailments associated with the aging process.

Thus diet looms larger and larger as both problem and solution. New laboratory techniques are identifying more and more carcinogens and mutagens in our food. At the same time science is understanding better and better how they work and how they can be stopped. Some cancers, and these tend to be the rarer ones in the United States, appear to be caused by viruses. But most, perhaps 80 percent, appear to be caused by things in our environment. Tobacco smoking is the clearest case: it causes about 30 percent of cancer deaths (as well as 25 percent of fatal heart attacks) in the United States. Diet may come right after smoking as the next most important risk factor. Other factors may affect particular groups of people, Ames adds, including drugs used in large quantities, certain cosmetics and occupational exposures.

At the moment, the best advice seems to be still what we have been hearing the past couple of years: eat more fruits, vegetables and fiber-rich cereals, and less fat. (A detailed discussion, *Diet, Nutrition, and Cancer*, is available from the National Academy Press here in Washington.) But in the near future scientists hope to be able to tailor diet recommendations to specific groups and even individuals.

At first glance, any article listing the carcinogens in our food has to be depressing. But in fact Ames is the bearer of glad tidings. He is also listing the anticarcinogens, and reporting that they appear to work against some of our other worst diseases as well. His optimism shines through the qualifiers and the understatement. All good science writers tread extra cautiously in the presence of possible cancer cures, but it seems permissible to me to get excited about brightening prospects for preventing cancer. After years of bad news, it is nice to see the tide turn.

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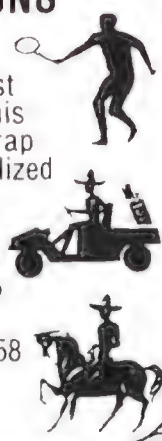

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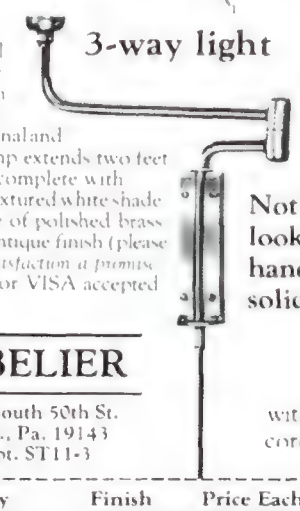

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# *Points of origin*

*Martin Luther's protests against the "spiritual bookkeeping" of his age led the world into modernity*

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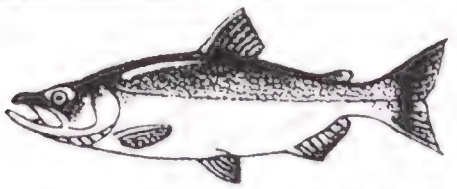
But there are a few points to be made amid the jubilee. First, Luther was essentially a creature of the medieval university system. He was a Biblical expert, a formidable debater and a remarkable Greek scholar. These are the traits that first put the young monk on a collision course with Rome.

And second, the original issues that set him in motion on that path had mainly to do with a kind of spiritual bookkeeping —the notions of sin, penance, holy relics and indulgences. Luther criticized those ideas—which led him to question five of the seven Roman Catholic sacraments, which led him to assert that faith was more important than good works, which brought him into conflict with the Church of Rome. And that, in turn, led him to the most radical and dangerous position of all, the idea of Everyman as his own priest before God.

At the time, the Roman Church, under the direction of a series of popes, seemed to be in a frenzy of granting and selling indulgences. An indulgence, in ecclesiastical eyes, was a remission of punishment



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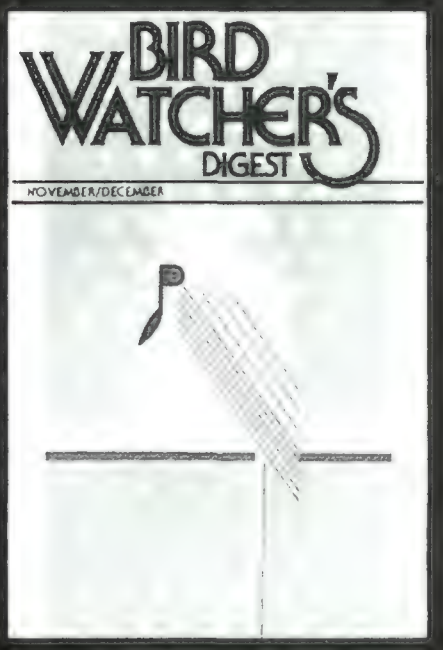

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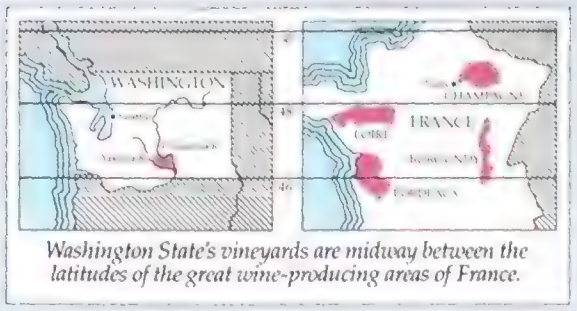

*Washington State's vineyards are midway between the latitudes of the great wine-producing areas of France.*

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Germanisches, Nuremberg

Contemporary portrait of Martin Luther was painted by his lifelong friend, Lucas Cranach the Elder.

that could reduce or erase the time sinners would have to spend in expiating their transgressions. Ordinarily, such punishment would be worked off after death in an eschatological backwater called Purgatory. The benefit of an indulgence was to lessen or eliminate the time spent there.

Along with the rise in sales of indulgences came a renewed interest in the veneration of religious relics. The devout would pay cash for a glimpse of a sacred object—a wisp of straw from the Christ Child's manger, for example, or a scrap of the Virgin Mary's cloak. In any case, from among the gullible or the guilt-ridden, or both, the money rolled in to Mother Church.

Even Luther's own prince and benefactor, Frederick the Wise, Elector of Saxony, took part in these sweepstakes. His aim was to make his Castle Church at Wittenberg the reliquary Disneyland of northern Europe. By 1520, there were 19,013 holy bones on display. The celebrated Luther biographer, Roland H. Bainton, has calculated that the persistent viewer of that collection—who also paid for the privilege—could reduce his stay in Purgatory by 1,902,202 years and 270 days.

In the autumn of 1517, Luther was enraged by the exhortations of a Dominican monk selling indulgences in a nearby district. Proceeds from the sales would be used to rebuild

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St. Peter's Basilica in Rome. The indulgence vendor made extravagant claims, offering subscribers a return to a post-baptismal state of innocence and haranguing his audiences to remember:

> As soon as the coin in the coffer rings,
> The soul from Purgatory springs.

Given these often grotesque practices, and Luther's skeptical character, the scene was set for a confrontation that was to shake the world: the Protestant Reformation. It began modestly enough. In Wittenberg and many other towns, All Saints' Day (November 1) was traditionally set aside for a mass display of relics. On this day in 1517, however, the burghers and pilgrims were greeted by a list of 95 debatable points of religious practice, most of them connected with relics, indulgences and the idea of penance, posted on the north door of the church. The list had been written by a certain Dr. Martin Luther, by then a professor at the University of Wittenberg.

Every schoolboy hears about the Ninety-five Theses, but originally they were nothing more than an agenda for a religious debate. This dry and somewhat pedantic document, however, was instantly taken up, translated from Latin to German, and reprinted throughout Germany and the rest of Europe.

What is often overlooked in Luther's career is his dedication to scholarship. In fact, Luther's scholarship led naturally to his strong suit in theological arguments: his unadorned mastery of the Bible. He knew Latin well enough, as did every cultured man in the Europe of his day, but he also had a knowledge of Hebrew and tirelessly drove himself to proficiency in Biblical Greek. Using Erasmus' newly-published Greek edition of the New Testament as his basic source, Luther pondered long and hard over every phrase and produced one of the world's greatest translations, a new German Bible. The Bible could now be read and understood by the people.

But Luther's powerful German translation was more than just an exercise in scholarship or an aid to increased religious freedom. Its resounding phrases and cadences became the linguistic coin of the realm.

The die was cast; there was an extremely "dangerous" man teaching and writing in Wittenberg. The next three years saw Luther in an increasingly vola-

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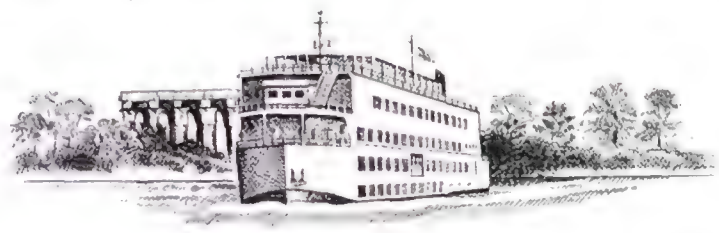

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# A FEW IMPARTIAL WORDS TO HELP YOU DECIDE WHICH FOOD PROCESSOR TO GIVE.

## EVALUATIONS OF 4 MODELS REPRINTED FROM THE COOK'S MAGAZINE, BROUGHT TO YOU BY THEIR UNANIMOUS CHOICE FOR FIRST PLACE.

### CUISINART

The reason Cuisinart is practically the generic term for food processor is apparent in the quality and performance of the DLC-7 PRO ($275). It scored as high as possible with one tester in all but two categories. (She found it left a little cheese on top of the blade and trapped a small amount of not-completely-processed peanut butter under the blade.) The other tester thought it performed virtually flawlessly. Well designed and heavy, with the unique feature of separate switches for pulse and on/off, the Cuisinart even has the best instruction booklet and a fine warranty (two years on the processor, to be increased to three on October 1, and 30 years on the rotor, stator, and bearings). Available attachments include five slicing blades, a shredder, two funnels, a french fry cutter, and two julienne blades, a blade holder, and pasta machine.

Our testers' only suggestion is that a standard feed tube might be included for use with small quantities. The Cuisinart was the top choice of both testers when they were not considering price and even when they were. Other Cuisinarts include the DLC-10E at about $130, the DLC-8F at $190, and the DLCX at $390.

### ROBOT COUPE

The Robot Coupe 3500 *looks* wonderful. Its sleek, high-tech design, heavy weight, and long warranty (30 years on rotor, stator, and bearings, one year on all parts) indicate very high quality. The instant stop feature, the magnetic lock on the work bowl, and red and green warning-ready lights indicate a real concern for safety. Its performance received excellent ratings in only two tasks—making peanut butter and slicing strawberries. After less than one minute of kneading, it stalled for five to eight minutes even though its alleged capacity was not exceeded by our recipe. Although it shredded the cheese very well and left none on top of the disc, the machine wobbled and the bowl came loose from the base. One tester noted, "It was so fast, there was no controlling it."

One tester found the flashing ready lights very distracting when the machine was pulsing. The instant stop feature makes the machine shudder violently as it stops, which is especially disturbing when pulsing on and off. A full complement of accessories is available—dough blade, citrus juicer, pasta attachment, three slicers, three shredders, ice/Parmesan grater, french fry cutter, and ripple cutter. There are several other models: the 2000 at $125, the 2100W at $150, the 2800 at $225, and the 3600 at $275. Of the three expensive machines, the Robot Coupe placed third.

### KITCHENAID

KitchenAid's reputation as a high quality brand remains intact: the food processor worked extremely well and its design, quality, and weight were given excellent ratings. Although it stalled after kneading the bread dough for one minute, the machine didn't move around on the counter and the dough was well kneaded. The cheese shredding was excellent with good control, and although one tester felt it rattled when shredding, it left no cheese on top of the disc. Its performance with the peanut butter, onions, and strawberries was excellent; its pureeing ability very good; the mousse was quite smooth, but the machine did jump around a bit. One tester felt the slicing blade does not snap onto the shaft and could be dangerous if dropped. Additional slicers, a french fry cutter, and ice/Parmesan grater are available as well as a pasta maker and juicer. The KitchenAid 700 at $264.95 was rated second in both categories. The new model 400 will be available next month at about $169.95.

### SUNBEAM

Neither tester picked the Sunbeam at $131.95 in either category, although, except for the cheese and strawberries, it did an adequate job with the tests. It made an excellent, fully kneaded dough without stalling (although it did evidence some strain), and made excellent peanut butter in two minutes. Although it managed to handle the chicken, the machine crawled as it processed it. When working with the onion it left a few larger pieces unchopped. Four slicers, two shredders, and a french fry cutter are available. The model 14011 is $120.95, the 14056 is $69.95.

The Sunbeam 14021 has some features which seem like excellent ideas but don't work as well as they should. The food pusher separates into two sections so that, theoretically, one carrot or other slender food can be sliced at a time. Unfortunately, when you need to use the whole feed tube, the pusher keeps coming apart, making it difficult to shred cheese or even slice strawberries. Our testers felt a one-piece pusher should be included.

The other feature which should work better than it does is the "slinger," a continuous feed chute which, according to one tester, "needs an *awfully* large bowl to catch the food." The other tester exclaimed, "It spit food all over the place."

**Cuisinart®**
**Food Processor**

For more information write: Cuisinarts Inc., 411 (S) West Putnam Ave., Greenwich, CT 06830.
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tile series of interviews and disputations—with both secular and church authorities—at Heidelberg (April 1518), Augsburg (October 1518) and Leipzig (July 1519).

An incident that occurred at the Leipzig debate is symbolic of Luther's persona. At one point in the debate—which took place before a large, skeptical audience of churchmen and politicos—Luther's adversary suggested that some of the brash young monk's complaints about the Church of Rome sounded suspiciously like those of John Hus. This was strong language indeed because Hus, an early Church critic, had been burned at the stake in the city of Constance a century earlier. Hus' followers had commonly been regarded as antiestablishment radicals, anarchists and barn burners who would sooner have seen society destroyed than allowed to continue on its course.

Luther used the lunch recess to review the corpus of Hus' doctrines in the Leipzig library. On his return, he publicly averred that on most points Hus was entirely correct. Moreover, Luther could find no reason why the man had been condemned. By the next year he was recklessly declaring, "We are all Hussites without knowing it."

As the debates continued, it became clear there was no stopping the storm of protest Luther had loosed among the peasants, and among the dissatisfied and land-poor aristocracy who were tired of seeing their nation drained of cash for Rome. In 1521 the papal legate to Worms reported back the following scene: "The whole of Germany is in full revolt; nine-tenths raise the war-cry, 'Luther!', while the watchword of the other tenth who are indifferent to Luther is: 'Death to the Roman Curia'. . . ."

Like the good logician he was, Luther returned Christianity to first principles. Working from a basis in Scripture, he brought into being a religion that emphasized the one-on-one relationship between Man and God, unmediated by clergy, saints or ritual.

In that singular view, like all the great thinkers of the Renaissance—Shakespeare, Machiavelli and Montaigne, to name three—Luther, too, nudged mankind toward the thoroughly modern idea that individuals are at least as important as institutions.

*Michael Olmert*

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# The Illuminated Vortex

# The Illuminated Vortex

*Understanding how the in-cylinder flow of the fuel-air mixture is influenced by chamber geometry provides a key to improving engine performance. By applying a laser measurement technique, a researcher at the General Motors Research Laboratories has gained new insight into the behavior of the flow.*

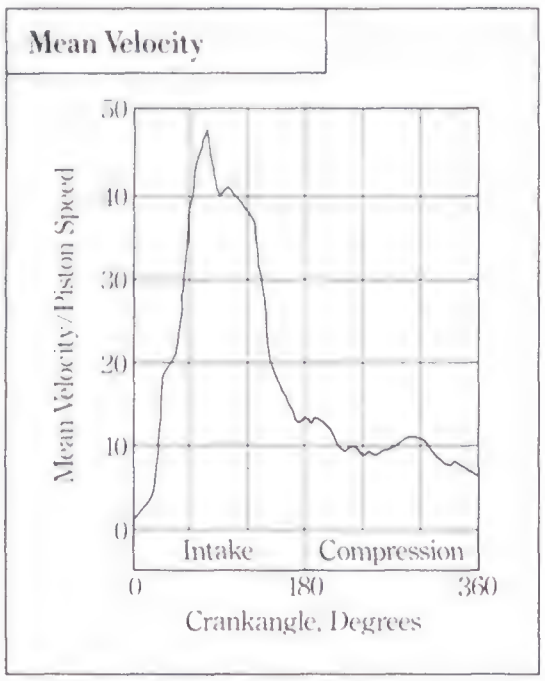
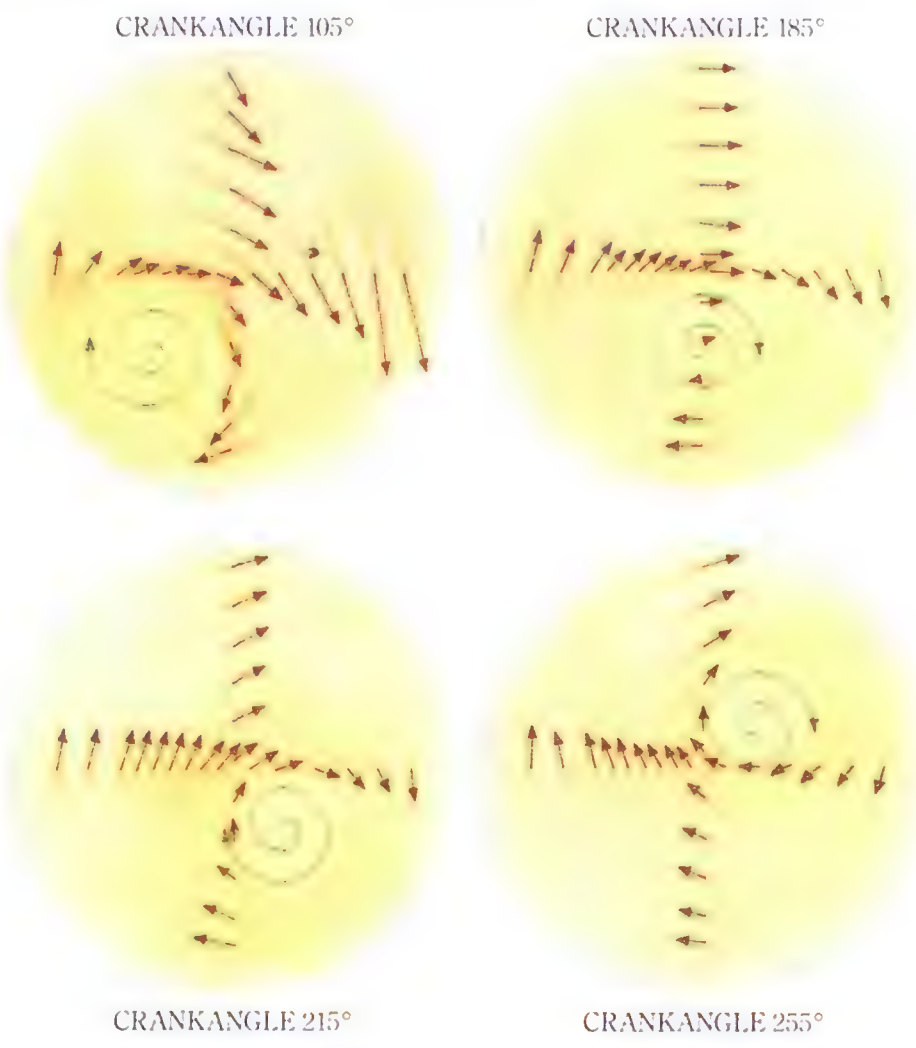



*Figure 1: History of mean velocity at a single engine location.*

*Figure 2: Panoramic view of engine flow patterns. With changing crankangle, the center of rotation precesses from the cylinder's lower left quadrant to its upper right quadrant.*




THE FLUID motions inside engine cylinders have considerable influence over the progress of combustion. Mixing of air and fuel, combustion rate, and heat losses from the cylinder are all important transport processes strongly dependent on fluid motions. The motion inside the cylinder has two components. Mean velocity influences the transport of momentum, energy, and species on a cylinder-wide scale, while the turbulence component influences the same phenomena on a local basis. The in-cylinder flow field depends primarily on the geometry of the cylinder and inlet port. Hence, decisions made in the engine design stage exert a controlling influence over the flow. But before questions about how different geometrical features affect the flow field can be answered, the problem of how to measure the flow must be solved. By applying Laser Doppler Anemometry (LDA), Dr. Rodney Rask, a researcher at the General Motors Research Laboratories, has obtained detailed measurements of the flow field.

LDA is a technique in which two focused laser beams pass into the cylinder through a quartz window. In the minute measuring region where the laser beams cross, a regular pattern of interference fringes is created. As the 1-micron particles, which have been added to the engine inlet flow, cross the measurement region, they scatter light in the bright fringes. In Dr. Rask's LDA system, the scattered light is collected by the same lenses used to focus the laser beam, and measured by a photomultiplier tube. The resulting signal is processed electronically to determine the time it takes a particle to traverse a fixed number of fringes. Since the fringe spacing is a known function of the laser beam crossing angle, this transit time provides a direct measure of velocity.

During operation of the LDA, measurements of velocity as a function of engine rotation (crankangle) are made at a number of locations within the cylinder. The instantaneous velocity at each point must then be separated into mean and turbulence components. The simplest technique is to declare that the mean velocities for all cycles are identical and ensemble average the data. However, this approach ignores the cyclic variation in the mean velocity. Another technique looks at individual cycles and uses a variety of methods, including sophisticated filtering, to split the instantaneous velocity into its components. This

approach is consistent with the LDA measurements, which clearly show that the mean velocity does not repeat exactly from one engine cycle to the next.

Differences in the flow field from one cycle to the next can seriously compromise engine efficiency. Near the end of the compression stroke, it is important to maintain a consistent velocity at key cylinder locations (e.g., at a spark plug). Dr. Rask's LDA measurements have identified design features that control cyclic variability.

FIGURE 1 shows mean velocity measured at a single location during an engine cycle. High velocity exists during the intake stroke when the inlet flow is rushing through the narrow valve opening. This jet-like flow into the cylinder causes large velocity differences between adjacent cylinder locations and produces strong turbulence. As the end of the intake stroke is approached (180 degrees in Figure 1), the levels of both mean velocity and turbulence drop rapidly. This decrease is a result of the changing boundary conditions for the cylinder—from strong inflow to no inflow. During the compression stroke the flow field evolves, but it undergoes no drastic changes. However, in a high-squish chamber, where the flow is forced into a small bowl in the piston or cylinder head, considerable turbulence is generated near the end of the compression stroke.

Measurements from many cylinder locations are necessary to make the flow field understandable. Figure 2 shows four flow patterns covering a period from near the end of intake into the compression stroke. Note the strong vortical flow, with the center of the vortex away from the cylinder center and precessing with changing crankangle.

By experimenting with geometrical variables, Dr. Rask has gained new understanding of phenomena observed in operating engines. The resulting knowledge has guided the design and development of new engines with a minimum of trial-and-error testing. The LDA findings are also being used to validate and calibrate engine flow computer models under development.

"From our measurements," Dr. Rask states, "we have been able to deduce how changes in the geometry of the port and combustion chamber modify the velocity field. These flow field effects are now being used to help designers tailor engine combustion for optimum performance."

General Motors

GM

MARK OF EXCELLENCE

## THE MAN BEHIND THE WORK

Dr. Rodney Rask is a Senior Staff Research Engineer in the Fluid Mechanics Department at the General Motors Research Laboratories.

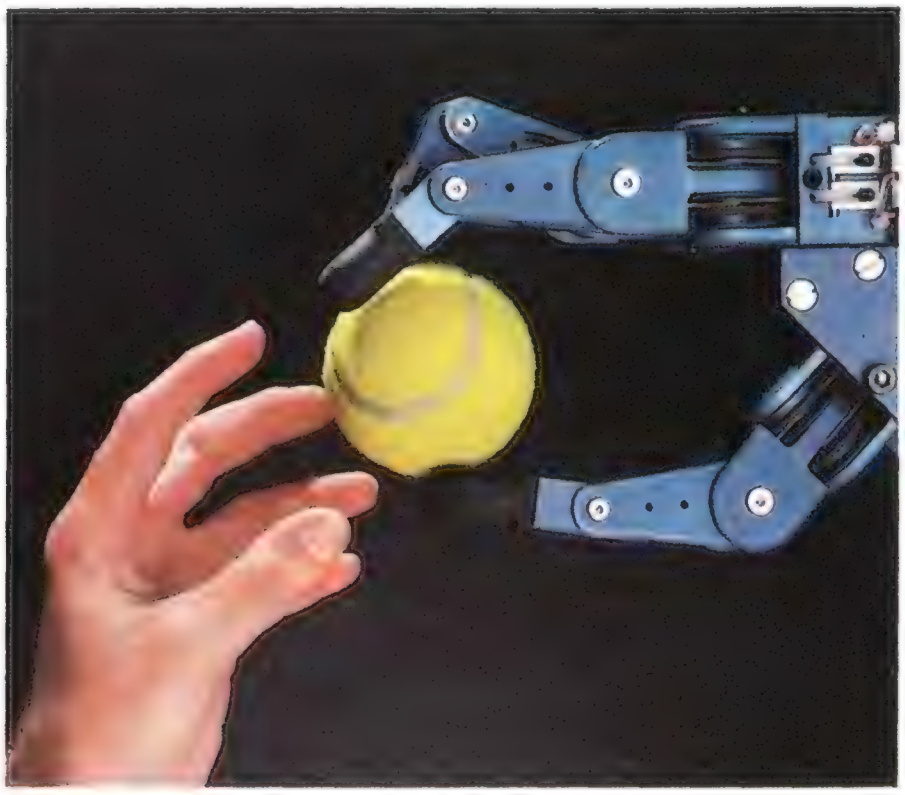
Dr. Rask received his undergraduate and graduate degrees in mechanical engineering from the University of Minnesota. His Ph.D. thesis concerned the Coanda effect.

Prior to joining General Motors in 1973, Dr. Rask worked on the design of nuclear reactors at the Knoll's Atomic Power Laboratories. In addition to further refinements in LDA measurement techniques, his current research interests include computer simulation of engine systems, with special emphasis on the intake manifold.

*By Jeanne McDermott*

# Robots are playing new roles as they take a hand in our affairs

*Coming of age, using computers for brains, lifelike machines are crossing the border between science fiction and high technology*



Computer-guided gripper at Stanford demonstrates its dexterity as it takes tennis ball from a human.

You find Emilio Bizzi's office past the monkey experiments on the top floor of the psychology building at the Massachusetts Institute of Technology (MIT). An aura of Continental ease surrounds the neuroscientist as he describes his work. "I am concerned with how the brain controls movement." He lifts his arm off the table to demonstrate, following its trajectory with a marveling but critical eye. "Robots clearly spell out the problem."

At Carnegie-Mellon University in Pittsburgh, Hans Moravec leans over a barrel-high contraption that rolls on wheels, scans the world with a camera and navigates by computer. He describes himself as a science-fiction fan who once wanted to build a time machine. Now a computer scientist, he pursues work that is equally delightful and futuristic. "Mobile robots," he grins, "are test-beds for intelligent machines."

The rehabilitation center at the Veterans Administration Hospital in Palo Alto, California, radiates cheer, especially when a quadriplegic client rolls in to meet the new electronic aide. An angular metal arm, no bigger than a human one, rests inconspicuously in one corner. Within an hour, it fetches and carries, responding to commands like a well-trained pet. The client drinks from the machine's hand. Explains Larry Leifer, the Stanford engineer who directs the center and conceived the project, "With robots, I want to replace function, not anatomy."

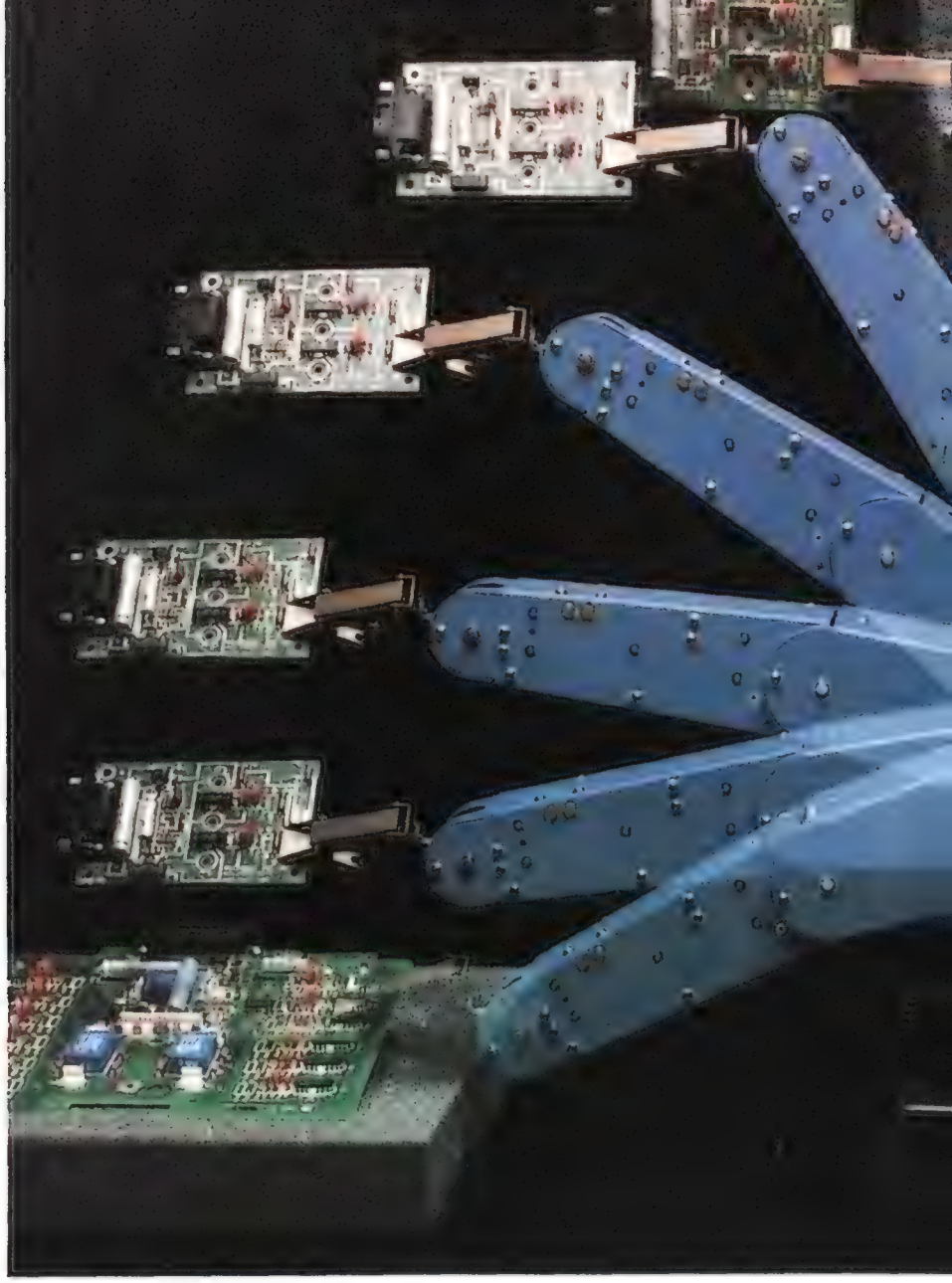
Partially assembled, Andy Warhol robot is being made ready for starring role in Broadway show next year.

Times change fast, especially in the technological landscape. Twenty years ago, Bizzi, Moravec and Leifer would have been laughed out of their laboratories for consorting with robots. Science fiction, not serious science, vouched for the humanlike machines. But within the space of a generation, robots crossed over. The development of microcomputers bolstered the belief that intelligent machines, able to work and act as well as ponder, could be built.

Today they are with us, and in the future, whether they bring prosperity or unemployment, they promise to be omnipresent. In Japan, where more than a half of the world's robot population resides, the government plans to employ them in nearly every field from fire fighting to guiding the blind. The Japanese are calling it a "robolution," a revolution that extends

*Photographs by Mark S. Wexler*

*Robots are coming of age*



Microbot Alpha, a new industrial robot controlled by a microcomputer, has a versatile arm and gripper.

Dan McCoy/Rainbow

Robotic antique, 1960s hand with pressure-sensitive fingertips, was for an early MIT arm that did not work.

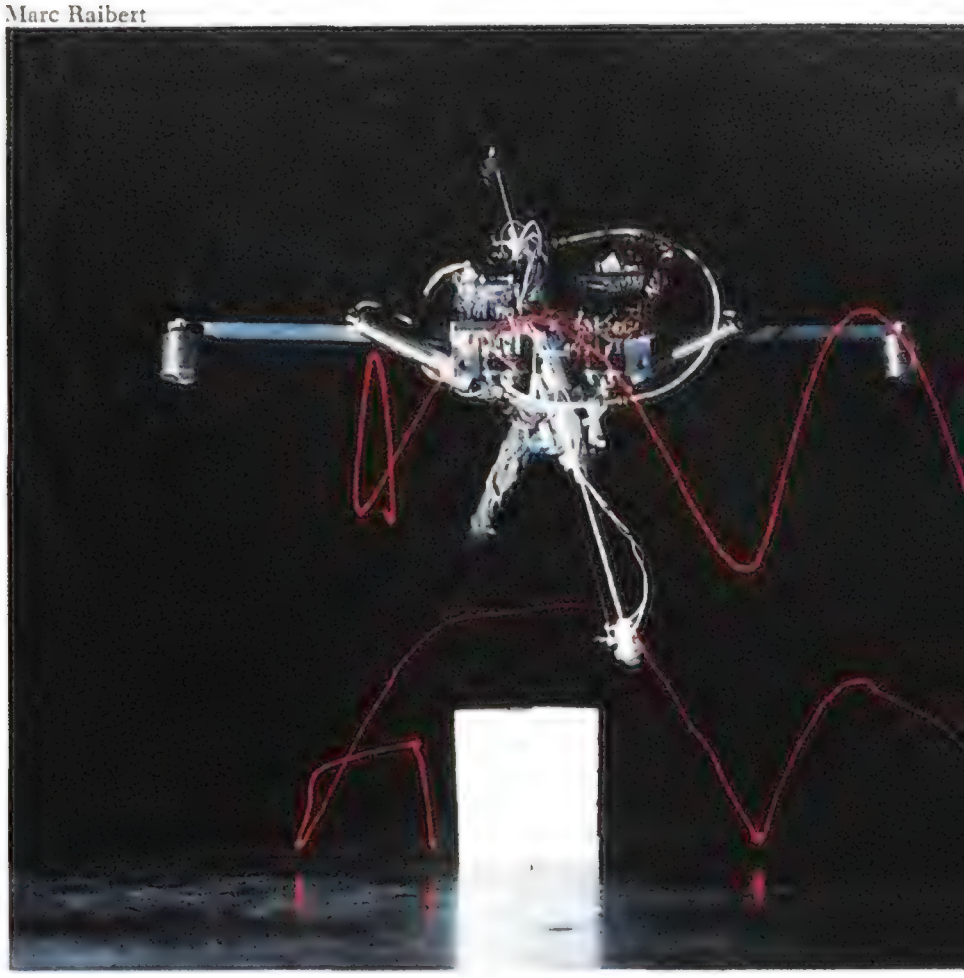
from factory spot welders to devices that slice sushi for overworked chefs to piano-playing home robots (available, with many other talents and a price tag of $42,000, from a leading Toyko department store).

Americans expect nothing less. "There is hardly an area that robotics will leave untouched," says Tom Binford, director of the robotics division of the Artificial Intelligence Laboratory at Stanford University. He cautions, "People talk about robotics as if the machines were here. Much of it remains to be developed." No one really knows when the machines will cluster on factory assembly lines or nurse the sick, build houses, mine planets and eventually do household chores. But optimism is a hallmark of the field. "We are coming full circle from the days of Rome," says Charles Rosen, chief scientist at Machine Intelligence Corporation in Sunnyvale, California. "Only it won't be human slaves."

Such speculation, however, is a poor guide to today's robots. "Let's face it," Rosen says benignly, "today's robots are stupid." About 6,000 robots work in the United States, most of them lugging parts in factories. They are metal arms that lunge and grab, pivot and relinquish, repeating the motion as perfectly as a re-

In time-lapse picture, Ben DuBois is programming it with a specific series of motions it then remembers.

Marc Raibert



Raibert's one-legged robot hops over a pile of blocks; path is traced by red lights attached to foot and hip.

played film. Some jerk like oil derricks and others bend over backwards like gymnasts. But whether they pick up transistors or engine housings, they are precise and obedient, going only where told to go. Their trump is a glimmer of flexibility: they can do more than one task.

Even these relatively rigid robots are perceived as posing a threat of unemployment for human workers. In Japan, where the workers at first welcomed robots, there are warnings that the honeymoon is over. But Soichiro Honda, whose cars are built by a joint human-robot workforce, points out that this problem lies in the hands of managers, not scientists or technicians. Any businessman incapable of taking advantage of robotics, he believes, cannot be called an able businessman. But one who fires employees because of robotics cannot be called able, either. Labor and robotics should "prosper and grow together," he says.

Managers will soon need all the wisdom they can muster, for scientists are already at work on basic questions. How do you give metal parts and silicon chips dexterity, mobility, intelligence or any other quality that humans possess? How do you make machines that cope with slivers of life's chaos? How do you control

Marc Donner drives Sutherland's six-legged crawler: mechanism of walking is challenge to roboticists.

Agile "Functionoid," built by Odetics, moves toward a pickup truck and, left to right, climbs into the back.

them? Feats that come naturally to living creatures evolved over millions of years. Roboticists hope to work faster.

Despite the breadth of the field, the core group of researchers behind the new generation of robots would scarcely fill a high-school auditorium. They train in computer science, physics, engineering and neuroscience, but cross disciplines in pursuit of big questions and the prospect of new frontiers. As David Nitzan, director of robotics at SRI International in Menlo Park, California, explains, "For another 20 years, robotics will remain a young field where anything goes." "Anything" is a license to take even the wildest ideas seriously.

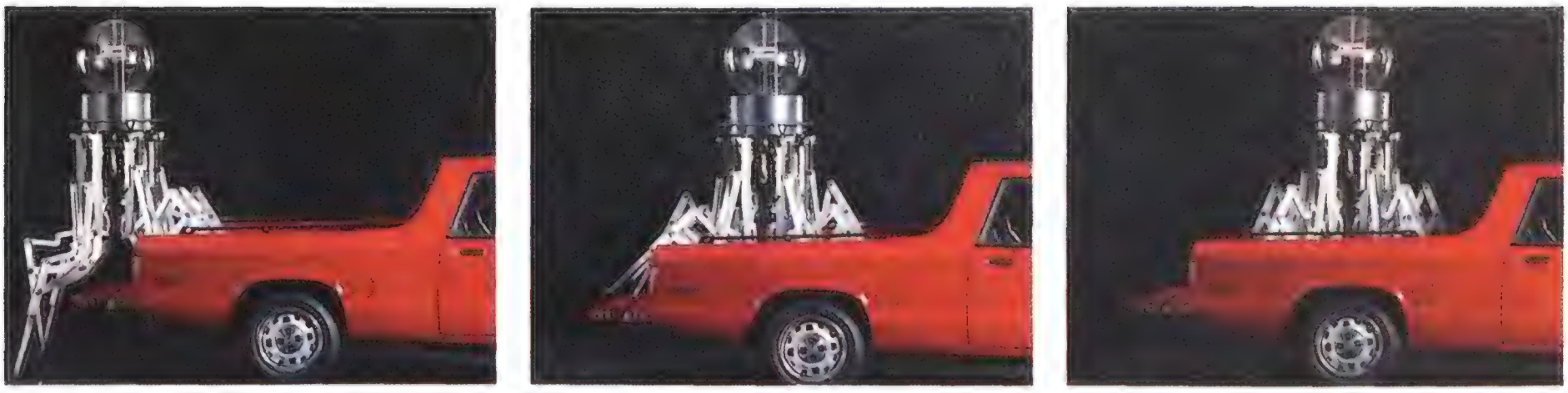
It is only 20 years since the birth of the field of artificial intelligence (AI). Initially, AI focused on duplicating decision making and reasoning with a computer. Victor Scheinman, now a vice president of the Massachusetts robot firm Automatix, was a student working in Stanford University's AI Lab. "We wanted to give the computer a useful physical tool, a mechanical manipulator that could do more than just display data," he says. Scheinman and his cohorts played with arm designs. They linked a prosthetic arm to a computer, constructed a snakelike arm with air bags and finally settled on a slender all-electric manipulator. It was a breakthrough that put Scheinman's expertise in demand. In the early 1970s he traveled to MIT, where he designed a pint-size manipulator that at one point was envisioned as a medical drone. With such a device a surgeon in, say, New York could conduct an operation in the Arctic. But the idea took a back seat when General Motors placed its first large order for Scheinman's robot arm, a move that signaled major new industrial interest in robots of many kinds.

Scheinman, who recently returned to Stanford to complete his PhD, describes himself as a dreamer fascinated by the assembly process. According to friends, he hangs around factories the way others hang around ballparks. "We have been locked into a traditional approach to robotics," he says. Something in Scheinman's smile, as he sits in an office surrounded by robot arms that already qualify as antiques, assures you that the approach has been changing.

New robots confirm it. Microbot of Mountain View, California, makes a knee-high robot whose tendonlike wire cables, rather than motors at each joint, account for its diminutive stature. The company sold more than 1,000 to universities and firms as teaching devices. Now the Microbots are elbowing their way into the laboratory, pouring radioactive pharmaceuticals and inspecting soap flakes.

No matter how dexterous arms get, Ken Salisbury believes that robots literally deserve a hand. "Current robots are just not dexterous," says the impish-looking mechanical engineer, pointing to a three-fingered gripper he designed. "Try putting together a car with pliers. That is about the analogy." When Salisbury began his thesis handiwork at Stanford University, his major concern was practicality. He also built his gripper to satisfy curiosity, and for fun. Now he works at MIT's Artificial Intelligence Laboratory, an enclave with the feel of a think tank and the frenzy of a bus terminal, where the distinctions between people and machines fall away. Nothing seems so prosaic here as a disembodied hand, made from bright-blue aluminum, with no palm and three fingers that sway haphazardly (p. 61). Even in this stylized state, the device satisfies that vague longing to see the human body reflected in a machine, to see a living function translated into mechanical parts. As Salisbury explains that the robot hand has three fingers because three are the minimum necessary to pick up and reorient an object, he gestures with his own. A smile creeps across his face. Even he cannot view the device with detachment.

*Jeanne McDermott, a Boston-based free-lancer, wrote on kaleidoscopes in November 1982* SMITHSONIAN.



Radio-controlled 375-pound robot can lift almost five times its weight. Computers, sensors may be added.

Arms and hands go only so far. Legs might someday carry robots into the more than 50 percent of the world's land mass that happens to be too rough and rocky for anything with wheels or tracks. At Carnegie-Mellon University (CMU), Marc Raibert and Ivan Sutherland are chasing down fundamental knowledge about legged machines with pogo sticks, you might say. Raibert, a robotics engineer who keeps a balance board in his office, explains with a wry smile, "They are springy, they interact with the ground. There seemed to be something fundamentally similar with the way pogo sticks behave and the way legs behave." Odd . . . until you think about it.

Ivan Sutherland was one of the few who took Raibert seriously. In his 40s, Sutherland is as terse and independent-minded as a prairie homesteader. The "father" of computer graphics and former head of computer science at the California Institute of Technology, he also knows a smart idea when he hears one. "It was the cleverest choice of building the simplest possible legged system," he says. The two teamed up, united by inquisitive minds and a maverick distaste for conventional wisdom. They beam with excitement about their recent findings but speak cautiously, fearing they will be misunderstood.

Raibert built a computer-controlled hopper. It is a springy metal pole, a little bit smaller than a two-year-old child, tethered on a stiff pipe like a horse on a lunge line. It hops in a circle, keeping its balance in one plane. Under computer control, the leg does an exquisite steeplechase. "Marc discovered that you can separate the control of the single-legged machine into three parts," Sutherland explains. The mathematical computations for balance in this case turn out to be unexpectedly simple. They depend on the height of the hopper, the position of its foot on landing and its upright attitude. What creates the undercurrent of excitement is that the simplicity may result in entirely new walking machines.

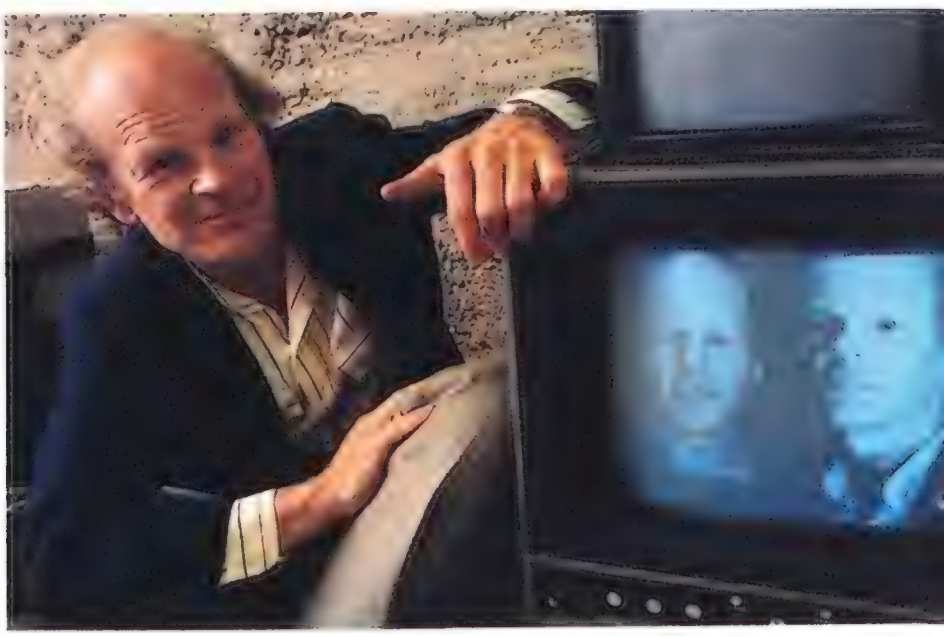
Underwriting his own research at CMU, Sutherland built a six-legged crawling machine. As most insects can tell you, six is a magical number in locomotion. It means that three legs always touch ground, providing a stabilizing tripod. Compared to Raibert's gleeful hopper, the crawler is a behemoth (p. 63). A driver rides it through its paces. Sutherland worked out the control of its gait, center of gravity and other variables.

Today Sutherland is ready to tackle the problems of moving at a faster pace. "Have you ever watched a runner stop?" He pauses for an answer before giving his. "He leans back a lot. Now if he were standing still and leaned back that far, he would fall over. The issue of locomotion is largely the issue of keeping upright. That is true with people. That is true of machines with many legs." Sutherland is now building a four-legged walker that won't fall over when it stops.

A small Anaheim, California, firm called Odetics has developed the only walking machine now adaptable to commercial uses, the Functionoid. With a cylindrical body and a fishbowl head that rest on six spindly legs, it is a lithe, compact powerhouse (above). It weighs 375 pounds and presses 1,800 pounds. Considering that strong-armed robots typically lift a fraction of their weight, the feat is impressive. Its delicate and elegant movements make it even more so. It tucks its legs up like an owl, and then stretches them like a cat. On radio command, it plants three legs on the ground and lifts the back end of a pickup truck. Odetics envisions the machine doing sentry duty, clambering around construction sites and mines—even defusing bombs.

With increasingly elaborate mechanical limbs, robotics circles back to where it began, to the search for artificial intelligence. Now the quest turns not to conscious reasoning, but to the unconscious processes that underlie behavior; the coupling of sense and response; the invisible strings that move the puppet.

The shift is bringing robots to their senses. And machines may have any senses imaginable. Robots



Tom Binford uses TV to demonstrate the two images of himself "seen" by stereovision system for robots.

Marilyn Monroe robot is a Japanese celebrity, one of a popular line built by Shunichi Mizuno, at right.

sense electric fields as quickly as a shark and low-frequency sound waves as acutely as a pigeon, they map surfaces by showering an object with ultrasound or laser light, and feel with pressure-sensitive fingertips.

The problem is how to make sense of the torrent of information. Researchers at Stanford's Artificial Intelligence Laboratory set their sights on solving that problem in relation to the most complicated sense—vision. When you enter the lab, you see a lineup of computers behind glass. The product of 20 years of research, some of them can crudely see.

Tom Binford, a physicist and director of the robotics lab, is modest about what it has accomplished and immodest about its goals. "We work on the high performance end, on stereo computer vision," he says. He treats words like numbers: precise symbols for an imprecise world. Humans, he says, use stereovision, seeing a slightly different image from left and right eyes. Cameras can duplicate this (above). Binford concentrates on the mathematical processes that transform patterns of light into meaningful perceptions. "My focus is not the machine but the real world and the mathematical structures that represent it."

In another vision project, the computer is programmed to interpret an image of, say, an airplane. First, it detects edges, constructing an outline. Because of inevitable shadows, the outline looks like a cartoon drawn by a drunk. The computer smooths it out as well as possible. Then it riffles through its memory, searching a library of general shapes. It fits the shapes to the outline, like pieces to a puzzle. Finally, research associate Harlyn Baker explains, "It knows how these generalized shapes are arranged in objects like airplanes." After a good long wait, it recognizes a plane.

Understanding how the brain handles information is closely linked to the design of smart robots; it is hard to contemplate one without the other. James Albus, chief of the industrial systems division at the National Bureau of Standards in Maryland, thinks about both (SMITHSONIAN, October 1978). An engineer by training, Albus became fascinated by neuroscience in the mid-'60s. He wanted to participate in a research frontier that would stretch well into the next century. "I spent a lot of time watching insects, birds, dogs," he says laconically, gazing out of the window of his paper-cluttered office. He concluded that brains exist, not to do calculus, but to control behavior. "The brain of a mosquito can fly. It can land. It can drill holes in the skin. It can lay eggs and avoid getting swatted," he observes. Yet the mosquito buzzes through life with no more than a few thousand neurons, a pesky monument to what a little computing power can do.

The problem is that it is difficult to spy on neurons and catch them in the act of controlling behavior. Like heaven, the brain is best known by analogy. Albus saw that robots provided a useful one. "No one had ever built a brain before," he explains. "The microchip made it possible to approach the number of computations that go on in the brain." Albus set out to test his belief that the brain controls behavior in much the same way that a military unit or bureaucracy controls its employees, hierarchically. Information from the senses cascades up a chain of command and decisions cascade down. Knowledge of the world shapes the flow. Albus maps the mathematical processes along that chain, identifying the computing procedures that are shared by computers and neurons.

Ricardo Uribe, who runs the Advanced Digital Systems Laboratory at the University of Illinois, is on an even bolder quest. He integrates an understanding of life itself with the distant dream of bringing a machine to life: "My goal is to use the concepts of living systems to design and build new machines." Uribe, who fled Chile after the military coup, speaks with the clarity of one who had done a housecleaning on old ideas. Indeed, he has. He believes that living systems should not be viewed as static structures made up of unchanging parts, like clockworks. Instead, Uribe looks at a cell or an organism as a collection of processes rather than parts. "It is the organization of processes maintaining itself," he says, "that maintains the system's identity despite a constant change of constituents." (For example, the calcium in a child's bone is not the same as the calcium in an adult's bone, nonetheless it is the same bone.)

The advantage of this approach is that it allows the use of more complex concepts for modeling "life." Using a computer, Uribe has mathematically simulated a living organism as complicated as a paramecium. Now, he and his students are trying to embody his concepts in hardware as a first step toward a more lifelike robot. They are starting the construction of a complex network of microcomputers, arranged in a latticework of cubes. Each edge will have one computer, and the corners, or nodes, will contain memory chips. Thus, each node will hold data sent to it by six different computers.

What is important in this model is not the individual computers, but the network as a whole. Another key feature is that, unlike the Albus model, there is no

Debbie Huglin attends to resident of her Robotorium, unique New York toy store which sells only robots.

In Pasadena's Two Panda Deli, customers are served by a robot that cracks jokes while it waits on tables.

hierarchy of from-the-top-down control: each computer is as important as any other. The different computers are not synchronized, but can add data or draw it out of a common memory bank whenever necessary. This type of system, Uribe believes, is a much closer model of the way a living nervous system functions than is available in current computers. It would exhibit a fundamental property of living systems—autonomy—in that the collection of computers would not respond to an instruction or request in a predetermined way, but would answer in its own way.

Even Uribe is not sure he will see robots act like living things in his lifetime. But we can count on a population explosion of somewhat simpler devices. If one word describes the robots that will be with us during the next decade, it is "responsive." That quality assumes many dimensions. In a windowless laboratory, the scientists at the Jet Propulsion Laboratory in Pasadena, California, experiment with a one-armed robot and its coach, who eventually might be separated by millions of miles of cold space. "Imagine removing a TV camera from a satellite in space and sending a robot out from the shuttle. The operator on board the shuttle 'talks' to the robot with his hands. But there must be an intelligence built into the machine to understand the hands' language," says JPL scientist Antal Bejczy. The intelligence is something as simple as force and torque sensors clasped around the robot wrist. Bejczy transmits the forces and torques sensed by the robot to the joy stick. The coach feels exactly what the robot feels. The process reverses and the robot feels what the operator wants it to feel. Communication is literally at the fingertips.

Communication between a handicapped person and a robot prosthesis is every bit as critical. Neville Hogan, a mechanical engineer at MIT, is building a mechanical simulator that mimics the human arm. "It only makes sense to sneak a peek at Mother Nature and learn from the smart things that *we* do," he says. He flexes and extends his own arm, watching the motion with the single-minded intensity of a bird dog. "The muscle is springlike. It can quickly adjust to changes." He demonstrates the principle with a prototype clamped to a lab bench. When Hogan bumps it,

Shells of the first robots being manufactured by Androbot may represent the shape of things to come.

the tension changes and the arm appears almost to relax: a small but significant step that takes an artificial arm right into the realm of robotics.

As the repertory of robot responses grows, so do its roles. A robot may bow on Broadway in 1984. Broadway producer Lewis Allen cast a robot and a dog as the only actors in a 45-minute play. The robot is a life-size Andy Warhol look-alike, a tribute to the artist's comment that he thought he would enjoy being a robot (p. 60). What makes the robot unusual is that it avoids a set routine, such as those performed by figures at Disney World, programmed to respond to lights and sounds and the director's changing mind. So far, no Equity card.

The ultimate performer is the personal robot which reached the market this spring. Androbot, the San Jose, California, company launched by Atari founder Nolan Bushnell, is spawning them in a faceless industrial park where a handful of workers assemble the robots by placing circuit boards and battery-powered motors inside a shell (below) and setting the unit on two knock-kneed wheels.

Robotics is breeding a new generation of machines that we may soon meet as pets, if not slaves. Tom Frisina, the youthful, hard-sell president of Androbot, introduces BOB, short for Brains On Board, a robot still in gestation. BOB scuttles across the room, relying on ultrasonic detectors to avoid walls. When it senses a warm body with infrared detectors, it stops, swaying ever so slightly. BOB does get disoriented, a feature that makes it slightly human. A bop on the head and it speaks—20 words with a mild robot accent.

BOB is cute, a delightful gimmick, but even among those robotics engineers working on more serious problems, there is a singular awe and admiration for the human organism. "We underestimate the simplest things that we do," says Charles Rosen of Machine Intelligence Company. Gaunt as a stork, he lifts a pack of Winstons off the table, defying me to explain how his muscles, eyes and brain choreographed the task in less than a second without apparent effort. "The only ones who really appreciate how smart people are," he leans forward as if to share a secret, "are those who try to do some of these things with a robot."

New robotic pets will have two wheels, three sensors, and will speak with a vocabulary of about 20 words.

But cruise control, air conditioning, AM/FM stereo with autoreverse cassette, illuminated vanity mirror,

HONDA

Michelin radial tires, power windows, door locks and antenna are standard. Accord LX 4-Door Sedan

*By John Canaday*

# The rise and fall and rise again of the Pre-Raphaelite Brotherhood

*Victorian rebels who looked centuries backward for inspiration, this disparate group of painters is being rediscovered*

Dickens called them "mean, repulsive, and revolting." They were the Pre-Raphaelites, a strange, idealistic, contradictory school of painters, the rebel modernists of mid-19th-century England, who, as a first contradiction, named themselves for the mid-15th-century Italians they venerated as adopted ancestors. They were Victorians whose art was sincerely dedicated to Victorian pieties, but what with drugs, erratic sex and various morbidities, their interlocking lives have provided inexhaustible material for popular biographies and postmortem Freudian analyses. The very word "kitsch" might have been invented as a one-syllable reaction to Pre-Raphaelite style by tastemakers today, and was even close to scholarly critical opinion not too many years ago, but those days are gone. As the acid dollars-and-cents test of the current resurrection of Pre-Raphaelite paintings, just try to buy one.

The original group, calling themselves "The Pre-Raphaelite Brotherhood," got together in 1848 as a secret (but not for long), quasi-religious (but not very) society numbering seven, more than coincidentally a mystical number. All were under the age of 25; two of them, the poet Dante Gabriel Rossetti—thoroughly a Londoner in spite of his Italian father and half-Italian mother—and a wonder boy named John Everett Millais, later Sir John, were barely out of their teens. Just exactly what the Pre-Raphaelite creed was, is a muddle. Basic to it were revulsion against the Victorian scheme of things for vices it undeniably had (materialism, hypocrisy and social injustice) and idealization of the medieval past for virtues attributed to it (probity, idealism, faith and beneficent rule). The muddle's reductio ad absurdum is the list of personages past and present seriously proposed as embodying, in combination, "the whole of our creed" as drawn up by Rossetti for his mystical siblings. Rated like restaurants with from one to four stars, these progenitors included Jesus Christ (four stars); the author of the Book of Job (three); Homer and King Alfred (two each); Tennyson and Elizabeth Barrett Browning (one); and honorable mentions including Joan of Arc and Columbus—a strange crew in any Valhalla.

Rossetti failed to mention the single most direct inspiration for the Brotherhood, which was the Guild of St. Luke, formed in Vienna 40 years earlier to bring Christian virtues back to art vitiated, its founders thought, by the 18th-century heritage of flightiness, cynicism and loose living in general. The St. Luke Brothers moved to Rome, setting themselves up in an abandoned monastery as a cooperative, where the members, now known as the Nazarenes, led a semi-monastic life dedicated to purifying art by going still further back in the centuries to the 15th, rejecting all art since Raphael, and even that of Raphael himself. In other words, they were the first Pre-Raphaelites.

Raphael was the god of the 19th-century Academies; to reject him was to be antiestablishment as well as pro-purity, a double appeal to the young Englishmen. It was Raphael's worldliness, and the pagan sensuousness of his nominally Christian subjects, that offended the Nazarenes. Unfortunately, their efforts to emulate the majestic reserve and spiritual depth of the great

John Everett Millais' *The Bridesmaid* passes wedding cake through a ring nine times, a Victorian custom.

The Fitzwilliam Museum, Cambridge

Tate Gallery, London

Suicide of the 18th-century boy poet Chatterton was memorialized by Henry Wallis, who painted the picture in the actual attic in Gray's Inn where the poet died. Model was novelist George Meredith.

Italian frescoes have such a sterilized and dehydrated look that they offer little more than historical interest today, while the lode of variety and invention in the Pre-Raphaelites is not yet mined out in the current revival: in London, this coming March, the Tate Gallery will open a comprehensive Pre-Raphaelite retrospective, containing 250 works.

It is not surprising that Rossetti ignored the Nazarenes. His own conceptions in both poetry and painting were anything but monastic—lushly visionary and intensely (if not quite openly) sexual, and more notable for theatrical invention than for restrictive disciplines. Rossetti was in fact an alien spirit and a disruptive one as far as the Pre-Raphaelites' original tenets were concerned. Portraits by his friends show him with large, darkly romantic eyes, hair down to his shoulders, full lips—good-looking with a strong Bohemian flavor. Other descriptions and anecdotes make him less attractive. He had an almost feminine build, short and soft with narrow shoulders and wide hips. Emotionally he was erratic, lazy, affected, egotistical, inconsistent and shallow in likes, dislikes and loyalties—yet, with all this, a fascinator and ultimately a sympathetic personality.

In contrast, the two founding members were Millais —still a teenager, tall, with a mass of sandy curls above his handsome face, well-bred, and so precociously talented (to the point of genius, technically) that he was the darling of the Royal Academy school—and a fellow student, William Holman Hunt, two years older, of simple origin, a serious, profoundly religious, ordinary-looking young man who made up in indefatigable labor what he lacked in technical facility. Together Millais and Hunt had sketched out basic goals before they invited Rossetti to join the nascent Brotherhood. From the first, Rossetti exerted a disproportionate influence on the group image, abandoning the primary tenet of "truth to nature" for autobiographical/symbolical visions of his own emotional life, which offered rich material. The other four members of the original group are of no real consequence in the Brotherhood's story; it is tempting to believe that they were voted in for no better reason than to make up the magical number seven. For the record, they were Thomas Woolner, who intended to be a sculptor, and who lived next door to a man from whom, it seems, Rossetti was cadging lodging; James Collinson, a

*Critic and author John Canaday wrote on Edouard Manet in the September issue of* SMITHSONIAN.

Tate Gallery, London

Millais was only 23 when he completed his minutely detailed *Ophelia*, one of the outstanding paintings of the Pre-Raphaelite Brotherhood. The idea of showing Ophelia drowning was new but became common.

painter who got nowhere, a "stunner" according to Rossetti but "a meek little chap" according to Hunt; Rossetti's brother, William Michael, who was puzzled by the whole business but thought he might paint some day, although never did; and Frederic George Stephens, a friend of Hunt's, who also thought he might paint some day, and also never did.

Dickens issued his diatribes two and three years after the Brotherhood's founding, and there were other bitter attacks during the first years of what was, in sum, a steady rise in acceptance. By the end of the century the founders' style had been so sweetened by a second generation of followers, most of them second-rate, that Pre-Raphaelitism was widely esteemed in England and America. (France has yet to acknowledge that the Pre-Raphaelites ever exisited.) Their popularity lasted well into the early years of our century—then came the crash.

In retrospect, these one-time rebels against the conventions of their day seem to have set out to commit every possible offense against the esthetic code of the revolution we call Modern art. By the 1920s it was fashionable among sophisticates to laugh at the Pre-Raphaelites; by the 1930s anyone who had had a freshman course in art appreciation was familiar with them only as whipping boys. Art-appreciation teachers derided them in comparison with Picasso and Matisse, in order to clarify by contrast the innovative esthetics of the 20th century. They were no longer "mean, repulsive, and revolting"; they were not worth taking all that seriously. They were called "literary painters." Storytelling was beyond the Modernist pale; anecdotes belonged in print, not paint, and moral preachments, to which the Pre-Raphaelites were addicted, belonged in the pulpit. "Literary" was the most pejorative adjective in the art-critical vocabulary except "sentimental," followed closely by "realistic," and the Pre-Raphaelites were blatantly all three.

No matter that their adopted ancestors, firmly entrenched as masters in one of the greatest centuries in the history of art, were also storytellers; no matter that the Pre-Raphaelite insistence on detailed realistic reference to nature was adapted from those same masters. In our century Picasso and Cubism had shown that formal structure in painting must discard the imitation of form as the eye sees it. The human body, along with everything else, was only an elementary structure to be shattered into geometrical fragments and reassembled on new principles, while the Pre-Raphaelite code insisted on reproducing the body,

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Dante Gabriel Rossetti's sister, the poet Christina, posed for *Ecce Ancilla Domini* (The Annunciation).

along with everything else in nature, all in one piece down to the last eyelash and the smallest vein of a leaf.

Then there was the lesson of Matisse and the German Expressionists. They, too, distorted at will in order to relay personal inner responses to life (in Matisse's case, joyous; in the German Expressionists', violent and tragic), adding arbitrary color as another expressive device. Faces could be green, horses blue, and anything vermilion. Color for the Pre-Raphaelites meant the color of nature, vivified as if washed in clean air, but mandatorily the color of nature. Inner personal response was well enough served by the painter's record of his perception of the beauty of the natural world. It was God's world, and to mangle it would be to desecrate it. For such reasons, "old-fashioned" became an inadequate word to describe the Pre-Raphaelites. The assumption was that they had never been any good.

And indeed, even when given the advantage of a bias in their favor, plenty of pictures in Pre-Raphaelite style among later followers and hangers-on can justify this harsh judgment. The kind of arty mawkishness that appalls us today never lost its appeal for the Victorians. In the hands of second- and third-raters, the anecdotal, historical, mythical and religious subjects now seem to be expertly executed records of hilariously inept performances by amateur actors. As an introductory example at the very top of the second-rate list, take John William Waterhouse's *Hylas and the Nymphs* (p. 81), painted in 1896, almost half a century after the Brotherhood's founding. The market in Waterhouse's work is profiting from the Pre-Raphaelite revival, but by the standards of the first generation, either technical or subjective, he is Pre-Raphaelite only by surface imitation, and the damning word "kitsch" insists on coming to mind in spite of the picture's distinguished ancestry.

### *Poignance that escapes sentimentality*

Any school of painting deserves to stand or fall on the evidence of its best representatives. Millais' *The Blind Girl* (p. 80) triumphs over the triple hurdles of literariness, sentimentality and objective realism. It is "literary" to the extent that its subject is sufficiently anecdotal to have been just as effectively presented in verse or poetic prose; it is vulnerable to the infection of sentimentality if read only on the surface, but below that surface it is profoundly poignant; no distortion of any kind, either structural or expressive, intrudes on its minutely detailed realism, every bit of which is an effective part of the expressive whole. The setting is an actual one, with a view of the town of Winchelsea from the east; the models for the blind girl and her sister were local girls. The poignance of the moment,

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William Holman Hunt's *The Hireling Shepherd* was meant as a symbol of the Church neglecting its flock.

Millais' *Christ in the House of His Parents* offended many who thought everyday portrayal sacrilegious.

Tate Gallery, London

with the world gloriously lit by sunshine as a rainstorm passes, increases the longer we know the painting. The blind girl fingers a bit of grass in the exquisite tangle of blossoming weeds at her right hand, knowing them by touch but not by color; under no circumstances can she comprehend the beauty of the field and town and the miracle of the rainbowed sky above it.

Millais is arguably the one of the original Brotherhood who would have most successfully fulfilled its premises, if he had not had to leave the fold to make more money to support a rapidly increasing family. In his more conventional work that followed, he remained a superb technician and became one of the most successful Victorians, awarded with a fortune and a baronetcy. He was only 23, and still a Brother, when he completed his *Ophelia*, which on any list has to be a leading candidate for the masterpiece of the school. It is hardly a picture of anguish or madness as Shakespeare's heroine drowns in a shallow stream; instead, it is invested with a supernatural peacefulness in which the microscopically detailed (and botanically accurate) masses of plants become hovering witnesses to the girl's passage into their world (p. 75). Millais' reason for abandoning the Brotherhood was that he could no longer afford to spend a day on details of this kind, "no larger than a five shilling piece" and not much more lucrative at the prices the Brotherhood could then command. (Compare the plants with those in Waterhouse's *Hylas and the Nymphs,* which are derived from Millais'.)

*Ophelia* was painted in 1852, when those who were unsympathetic were under counterattack by England's foremost art critic, John Ruskin, who had lent his support to the movement the year before. Ruskin had a natural affinity with the Brotherhood. Nine years older than Millais (a considerable gap at their ages), he too had been a wonder boy, publishing the first volume of his *Modern Painters* at the age of 24 to become virtually the dictator of taste in English art. He had the Brotherhood's strong religious bent, having first studied for the ministry. Until the age of 17 he had spent his mornings with his domineering mother reading and memorizing the Bible. Wealthy, and conventional in the surface aspects of his way of life, he was—at least until his tragic later years—open-minded and acutely perceptive in his critical judgments. He had been spontaneously attracted to the prior-to-Raphael Italian Renaissance painters during tours of Europe with his omnipresent parents. Ruskin was not at all a bad painter himself, and an even better draftsman, with a passion for detail that, again, coincided with the Pre-Raphaelite tenet of "truth to nature."

At the time he came out for the Brotherhood, Ruskin had been married for three years to a beautiful—and socially ambitious—woman, Euphemia Gray, "Effie" to the circle. At some time during the three more years that the marriage lasted, Effie and Millais fell in love, and after a sensationally publicized divorce, they married. Ruskin, married at 29, had never seen a naked woman; he knew only the female nudes in painting and sculpture or possibly, in those early days of photography, artily retouched and tactfully posed photographs. With Botticelli's chaste, idealized, and anatomically incomplete goddess in *The Birth of Venus* as a model of what to expect, he was so shocked at the sight of Effie's sheer female physicality that he was unable to consummate the union, and Effie, after six years, was granted an annulment on the basis of her husband's impotence. She and Millais were prominent social figures during his following years of fashionable success, although Queen Victoria refused to receive Effie until Millais, in a message from his deathbed, begged her to. Ruskin, with remarkable control under the humiliating circumstances, continued his amicable relations with Millais—at least as a critic.

*Brooding women as a style*

Against the bowdlerism of other Victorian art and the hypocrisy of Victorian society, a strong current of repressed sexuality runs through Pre-Raphaelite painting—strongest in Rossetti. "Pre-Raphaelite" calls up the images of his brooding women more than any other stylistic facet of the school, with his *Ecce Ancilla Domini* (The Annunciation) running as at least an equal rival to *Ophelia* as the Pre-Raphaelite masterpiece (p.76 ). For centuries the Annunciation had been represented at the moment when a handsomely robed young woman, surprised at a daily task, receives the news of her miraculous pregnancy with a degree of natural shock, but gracefully, with humility at the honor bestowed. Rossetti's Virgin is a neurasthenic

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Birmingham City Museum and Art Gallery

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*Hylas and the Nymphs* was painted in 1896 by John William Waterhouse, a later follower of Brotherhood who frequently created dramatic versions of Greek myths and here cast some nymphs as femmes fatales.

adolescent in a rumpled nightdress who crouches against the wall by her bed and stares uncomprehendingly at the lilies borne by this handsome intruder as if recoiling from possible violence at his hands.

Rossetti's sister Christina, the poet (or, in those days, poetess), posed for the Virgin. Her brother's choice of pose and expression forecast his love affair with a neurotic, ailing, fretful beauty named Elizabeth Siddal, who appears in various roles in his early paintings (and as Millais' Ophelia). As "Guggums' " mental and physical health declined, so did Rossetti's passion. He finally married her, out of a sense of duty as she very well knew, and not long afterward she committed suicide with an overdose of laudanum, to which they were both addicted. Her place as a model was taken by his second great passion, which lasted for the rest of his life—Jane Burden, the wife of his protégé William Morris, another unhappy marriage in which Jane was frequently left alone for weeks or months, sharing residence, but not bed, with Rossetti.

Charges of sentimentality are dissipated by brilliance and validity of emotion of Millais' *The Blind Girl.*

In Rossetti's paintings, her face with only slight variations appears to the exclusion of all others of young women, even when the names of other models are known; even male characters bear her features.

Paintings as well as photographs show Jane Burden Morris with a strong jaw; a rather small mouth with full, curling lips; a short, firmly modeled nose; lidded eyes set wide apart; a low forehead almost entirely concealed by heavy masses of hair parted in the middle and falling to the shoulders in tight, crimped-looking waves—all this supported by a columnar neck faintly swollen as if with an incipient goiter. The description may not sound attractive, which is deceiving.

Jane Burden was a beauty; the entire Brotherhood was half in love with her. If her remarkable features ever took on any expression other than a melancholy brooding heavy with ingrown sexuality, none of the paintings or photographs for which she posed ever showed it. Rossetti's obsession with his love goddess produced one of his most curiously mannered paintings, *Astarte Syriaca,* the Phoenician Venus (p. 82). Rossetti was fond of recherché and elaborate titles. He set a record with *How Sir Galahad, Sir Bors, and Sir Percival were fed with the Sanc Grael; but Sir Percival's Sister died by the Way,* a tapestrylike watercolor

Manchester City Art Gallery

A favorite model of Rossetti's was Jane Morris. Here, as *Astarte Syriaca*, she is the Phoenician Venus.

and one of the finest of all Pre-Raphaelite paintings of the Arthurian legend.

It was Ruskin's idea that art should be based on national and individual integrity and morality, a universal language subject to interpretation at various levels. The Pre-Raphaelite Arthurian paintings, even though their subjects were legendary, were by inference rebukes to the crass commercialism and general ugliness of England under the Industrial Revolution, in contrast with the supposed idealism and universal beauty of her medieval past. They were also romantic escapes paralleling the medievalism and Orientalism of the French Romantic revival, with the great difference that the dreamy, static, self-consciously posed Pre-Raphaelite tableaux have nothing to do with the fire, passion and wild agitation of the French visions.

The least romantic of the original band was the hard-working, levelheaded Holman Hunt. As honest a man as you could find anywhere, Hunt had neither Millais' social aplomb and good looks nor Rossetti's wayward charm to help him on his way professionally. Where Millais complained that he could not afford to spend four months on a single figure, as he did on Ophelia, Hunt, obsessed with a next-to-impossible ideal of technical perfection, would work from five up to ten years on a single painting. "I work and work," he once wrote, "until I feel my brain as dry as an old bit of cork," and this same dryness affects some of his paintings; it is tiring even to try to absorb them. But not always. In his best work the precision and complication of his glossy surfaces and brilliant color are like enamel inlay of a delicacy that would be impossible in that medium.

### *Allegory of a failed Church*

*The Hireling Shepherd* is one of these (p. 77). The multitudinous details are united in a landscape and foreground so harmoniously integrated that the exhausting details are comprehensible as a single beautiful whole. At first glance the subject might be the innocent play of bucolic lovers, or perhaps a pastoral allegory, but assumptions of this kind are never safe in Hunt's pictures. While the mutual seduction goes on in the foreground, the shepherd's neglected flock wanders off into the corn. *The Hireling Shepherd* is an allegory of the Church as a failed or corrupted spiritual pastor; it is also one of the most beautiful landscapes in all English painting.

Hunt never for a moment yielded to temptations toward prettiness or repetition; each painting was a moral exercise and a test of strength; he is the least accessible of the Pre-Raphaelites because he is the only one who, in the end, exemplifies the social and esthetic credos of the Brotherhood at their full demanding

level. While Millais settled for fame and fortune, and Rossetti sank into a perpetual chloral-laden half-world, leaving the execution of his last pictures to assistants; while Ruskin, the mentor, never emotionally or mentally stable, sank into quiet insanity, Hunt labored on as a respected but not very successful relic of a school given over to prettiness and imitation in its second generation.

The saving name among these descendants is Sir Edward Burne-Jones, a wildly successful painter who held aloof from the hubbub surrounding him. Without pretensions to great depth, he developed a style based on Rossetti's but in no way imitating it. His slender, long-limbed beauties, described in graceful but never lax linear rhythms, exist in a serene unidentified other-world sometimes nominally medieval, or classical, but never less than his own. The 18 maidens descending *The Golden Stairs*, bearing trumpets, lutes, fifes, violas and tambourines, have distant ancestors in Fra Angelico's Florentine angel-musicians, but their world is not pseudo-Quattrocento. Then what is it? Certainly not London, 1880. And what is the symbolism of the golden stairs? The beauty of the picture is that it takes place nowhere, and the stairs, the maidens, the instruments, symbolize nothing. They exist simply for the delight they offer (right).

The Pre-Raphaelite revival that reveals again the beauty of pictures like these has, as its most obvious explanation, the simple pendulum-swing characteristic of art history as a judgment of styles. About 30 years ago an international school of Renaissance artists who had been thought of as decadent tag-ends of an exhausted century were reinterpreted as the now highly esteemed Mannerists. In America the Hudson River painters, who had sunk to the nadir of critical esteem (and the market), have been rediscovered as the foremost expression of our 19th-century art. In the widest swing of all, photorealism and other acutely detailed forms of realism budded in the late 1960s and flourished in the '70s as a reaction against the total abstraction that dominated international painting. This declaration of the legitimacy of uncompromising imitation of nature may, indeed, have helped relegitimize the Pre-Raphaelites.

Pendulums aside, however, art critic/historians increasingly realize that the arts of the past can teach us more about ourselves if judged by forces within their times that account for the forms they took. The Pre-Raphaelites were in most ways defeated, but it is what they aspired to, and achieved, that counts.

Tate Gallery, London

Edward Burne-Jones' *The Golden Stairs* was painted solely for the eye's delight. It carried no message.

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*By Edmund Morris*

# As a literary lion, Roosevelt preached what he practiced

As explorer, TR works on manuscript at portable desk during 1914 "River of Doubt" expedition in Brazil.

*The quintessential man of action, TR wrote about nearly everything that he did and his oeuvre was nothing short of monumental*

"This is not written very clearly: my temperature is 105 degrees," Theodore Roosevelt scrawled on the top of a manuscript submitted to *Scribner's Magazine* in April 1914. He might have mentioned, in further excuse, that he had thick gloves on, and that a cowl of mosquito netting obscured the vision of his one good eye, for he was writing in the depths of the Brazilian jungle, beset by a miasma of bloodsucking insects.

Traveling by Indian dugout, muleback and steamer, the sweat-stained and wrinkled manuscript found its way to New York City in a blue canvas envelope. So did a duplicate manuscript, dispatched by a different route in case the first was lost. Both arrived in time for scheduled publication. By then the author was nearly dead from malaria and dysentery, and pleading in vain with his fellow explorers on the "River of Doubt" expedition to abandon him.

What kind of person was this, to have such literary scruples when running a fever fit to kill? The answer is simple. Aside from his more famous identities as Colonel of the Rough Riders and President of the United States, Theodore Roosevelt was a lifelong professional man of letters. He wrote partly because he needed money (having lost nearly half his inheritance in youth). But mostly he wrote because he could not help it. Always, at moments of joy or despair, TR's instinct was to seize a pen. When the bewitching Alice Lee turned down his first proposal of marriage, he gloomily began to write a naval history. When she accepted him, he poured his rapture out in page after page of diary. He never let political triumphs pass without detailing them in "posterity letters." He was revising an article on labor only hours before he died.

It has been conservatively estimated that TR produced 18 million words—equal to about 30 years in the life of a full-time writer. His collected works amount to some 38 fat volumes—history, natural history, biography, criticism, political philosophy, essays and memoirs. He wrote 150,000 letters, some of them very long and very funny. As for his newspaper and magazine articles, a historian has complained, "They are like the sands of the sea in number."

Most of this gigantic oeuvre has been neglected for decades, although Roosevelt's treatment of naval operations in the War of 1812 is still regarded as definitive, and his delightful hunting books (much more about nature than killing) have never gone out of print. Whether we read him or not, we quote him every day in our common speech, for he was a phrasemaker of genius. Some of his expressions have become clichés, such as "the Big Stick," "the Square Deal" and "the wealthy criminal class." Other Rooseveltian coinages are part of the vernacular, but we forget who minted them. "Clean as a hound's tooth" is one. Also: "weasel words," "rubber-stamp Congress," "we've beaten them to a frazzle," "pussyfooting" and "mollycoddle." TR invented the verb "to falsify," the challenge "my hat is in the ring," and that marvelous phrase "the lunatic fringe," as in his letter to the idealistic reformer Amos Pinchot: "Dear Sir, when I

As President, the resolute Roosevelt sat for artist Philip Laszlo in boots and with riding crop clenched at the ready. An accomplished horseman and hunter, TR celebrated joys of "the strenuous life" in his books.

Never one to downplay an exploit, TR wrote about his capture of three boat thieves in Dakota territory.

spoke of the Progressive Party having a lunatic fringe, I had specifically you in mind."

Lately there has been a revival of interest in TR's writing, perhaps owing to the rapid rise in his historical reputation. We are rediscovering that TR was one of the most fascinating Americans who ever lived, and as Walter Lippmann pointed out, our only "lovable" Chief Executive. Vitality, curiosity, humor and an indefinable quality that his contemporaries could only describe as "sweetness" irradiate his prose:

> My address [in Butte, Montana] was felt to be honor enough for one hotel, and the dinner was given in the other. When the dinner was announced the mayor led me in—or to speak more accurately, tucked me under one arm and lifted me partially off the ground, so that I felt as if I looked like one of those limp dolls with dangling legs carried around by small children. . . . As soon as we got in the banquet hall the mayor hammered lustily with the handle of his knife and announced, "Waiter, bring the feed!" Then in a spirit of pure kindliness he added, "Waiter, pull up the curtains and let the people see the President eat!"

Western artist Frederic Remington based drawing on Teddy's account of his rowdy Badlands welcome.

Another quality that modern readers are surprised to discover in the writings of a politician is erudition. At the time of his accession to power in 1901, Theodore Roosevelt was recognized as the world authority on American game mammals. (Smithsonian Institution officials once sent a mysterious fossil to the White House, asking him to identify it; he not only did so, promptly, but furnished a life history of the original animal.) TR was also a humanist of note. After quitting the Presidency, he delivered the great address, "History As Literature," a text that should be engraved on the facade of every liberal-arts college:

> He [the historian] must ever remember that while the worst offence of which he can be guilty is to write vividly and inaccurately, yet that unless he writes vividly he cannot write truthfully; for no amount of dull, painstaking detail will sum up the truth unless genius is there to paint the truth.

He posed (opposite) with pals for a reenactment. Photograph was considered authentic until recently.

TR published two ornithological treatises before he went to Harvard. His first major work was *The Naval War of 1812*, published in 1882, two years after he graduated (A.B., magna cum laude, Phi Beta Kappa). He joked that the book, crammed with logistical and ballistic statistics, was "so dry as to make a dictionary seem light reading by comparison." Even so it won him an overnight reputation, at 24, as a historian of model impartiality.

Just as we find it hard to believe that *Naval War* was written by a young man ecstatically in love (TR even lugged the manuscript on his honeymoon), we are amazed to discover that *Hunting Trips of a Ranchman*, his next book, was written by an asthmatic widower of 26. Lyricism, humor, love of plants and animals—all are displayed. *Hunting Trips*, with its two great sequels, *Ranch Life and the Hunting-Trail* and *The Wilderness Hunter*, comprise, in Paul Russell Cutright's words, "a natural history trilogy of the West," enduring as TR's finest literary achievement.

Readers today may be put off by the titles of the trilogy, imagining it to be full of blood and guts. TR's love of killing cannot be denied, although modern ecological scholars like Paul Schullery have proved that he killed mainly for food, and stayed well within the law when he shot for sport or science.

The trilogy, in fact, concerns itself much more with life than death. Roosevelt observes Western nature (principally in and around the Badlands of North Dakota, where he operated his own free-range cattle ranch for two years) with an accuracy of eye and ear, and an understanding of the three-way relationship between flora and fauna and Man that is almost poetic. He feels—and with remarkable sympathy manages to communicate—the numb stiffness of an antelope in a prairie hailstorm, the bighorn's delight in its sinewy nimbleness, the relief of a horse when the hot saddle comes off and cool air plays over its back. He describes the structure of a prairie wild flower as microscopically as he describes the texture of an antelope's skin.

Such details are tossed off almost at random, because Roosevelt is always in a hurry to get on with his story. The reader is hardly aware that original scientific information is being imparted—for in the 1880s much of what he had to say about Western animal and plant life was quite new to biologists.

His chapter on the bighorn in *Ranch Life* remained definitive for decades, while his many writings on the bear are, in Schullery's words, "the finest contribution by a single author to our knowledge of bear habits and hunting prior to the work of William Wright."

Zoology aside, readers can revel in these books for their sheer literary charm. TR was neither a polished nor a facile stylist. "Writing," he confessed, "is horribly hard work to me." He tended to be repetitious, and lacked the fine instinct of where to begin and

Another Remington drawing in TR's ranch-life book illustrated story about bloody "desperado" gunfight.

Gauntleted TR writes in tent after his triumphant return from Cuban campaign with Rough Riders.

where to end. Metaphor for the sake of metaphor interested him hardly at all, although he was capable of original imagery, as in this extract from *Ranch Life*:

> When the days have dwindled to their shortest, and the nights seem never-ending, then all the great northern plains are changed into an abode of iron desolation. Sometimes furious gales blow down from the north. . . . They roar in a thunderous bass as they sweep across the prairie or whirl through the naked canyons; they shiver the great brittle cottonwoods, and beneath their rough touch the icy limbs of the pines that cluster in the gorges sing like the chords of an aeolian harp. Again, in the coldest midwinter weather, not a breath of wind may stir. . . . All the land is like granite; the great rivers stand still in their beds, as if turned to frosted steel.

What then are his literary virtues, as apparent in the Western trilogy? First, transparency of language. Rooseveltian sentences read beautifully aloud—always a good test of pared-down prose; even when skimmed at speed with the eye, they never have to be re-read. This is due in part to the clarity of his mind, yet it is in larger part the result of a natural feeling for rhythm (he loved strongly metric ballads, and was a good rider and dancer). He also made good use of such style-enhancing techniques as alliteration and onomatopoeia.

For example: "Suddenly a small animal swam across the little pool at my feet. It was less in size than a mouse, and as it paddled rapidly underneath the water its body seemed flattened like a disk, and was spangled with tiny bubbles, like specks of silver." A reader is not conscious of all those "s"s and "t"s, as he might be if reading poetry, but they help make TR's picture extraordinarily vivid. Again, "The little ducks went along like bullets, their wings working so fast that they whistled; flop, flop, came the great eagle after them, with labored-looking flight."

Roosevelt's mastery of alliteration and onomatopoeia relates to another unique quality in his writing—his phenomenal auditory imagination. This joy in things heard dates back to the years before he got spectacles at age 13. He was so myopic as to be half-blind, and had to rely on his ears to help sort out the blur in his eyes. (His juvenile notebooks, for example, almost always identify birds by call rather than by plumage.) *Hunting Trips* is as dense with sound effects as a radio script: the "clanging cries" of waterfowl, the "crack and jar" of trees split by frost, the "creaking and singing" of wagon wheels grinding through snow, the "hollow booming" of prairie fowl cocks in spring.

*Teddy takes on a bully—and wins*

When, in 1902, Owen Wister dedicated *The Virginian*, generally considered the first great Western novel, to Theodore Roosevelt, he was acknowledging his debt to the President as a pioneer of Western writing. TR's three so-called "hunting" books indeed contain many of the stock scenes that later became the clichés of Hollywood. But when Roosevelt first wrote them they were both fresh and true, and rooted in his own experience. Here is "Four Eyes" from the big city, walking into a saloon for dinner, and being accosted by a drunken bully, whom he proceeds to knock cold with a well-aimed right to the point of the jaw. Here is the dude riding off alone into the prairie in order to forget the death of his girl, carrying no props but his gun, his sleeping blanket, some matches and some salt. Here he is drawing a bead on a dangerous-looking Sioux who protests, "How! Me good Injun." ("I told him with sincerity that I was glad that he was a good Indian, but that he must not come any closer.")

The extended boat-chase sequence in *Ranch Life* is one of Western literature's best. Nothing better illustrates the physical drive and ferocious tenacity of Theodore Roosevelt (in those days chairman of the Little Missouri Stockmen's Association and deputy sheriff of Billings County) than this 19-page account of

*Edmund Morris won the Pulitzer Prize in 1980 for* The Rise of Theodore Roosevelt. *This article is adapted from a paper he delivered recently at the Smithsonian's Woodrow Wilson Center.*

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Roosevelt tips Presidential hat to U.S. fleet at start of world cruise; earlier, he wrote naval history.

pursuing three horse thieves downriver in dead of winter, then walking them back to civilization at gunpoint—nonstop, so as to stay awake and alive. It ends:

> I trudged steadily the whole time behind the wagon through the ankle-deep mud. It was a gloomy walk. Hour after hour went by always the same, while I plodded along through the dreary landscape—hunger, cold, and fatigue struggling with a sense of dogged, weary resolution. . . . After thirty-six hours' sleeplessness, I was most heartily glad when we at last jolted into the long, straggling main street of Dickinson, and I was able to give my unwilling companions [to] the sheriff.

At intervals between his Western books Roosevelt produced two biographies, *Thomas Hart Benton* and *Gouverneur Morris*, a volume of political essays, and a history of the city of New York. Popular in their time, these works no longer merit serious attention. But his self-described "magnum opus," *The Winning of the West* (four volumes, 1889-96), can still be read with pleasure as a masterpiece of narrative history.

The book, exhaustively researched in original frontier archives, tells the story of the spread of the United States across the American continent, from the earliest expeditions of Daniel Boone beyond the Alleghenies to the day Davy Crockett died at the Alamo in 1836. Roosevelt began it in his 30th year, convinced (after the Democratic Party swept back to power under Grover Cleveland in 1884) that he had no future in politics. "I should like to write some book that would really take rank in the very first class," he confided to a friend, and proceeded to pour the best of himself into it. Working with amazing speed and thoroughness, he completed the first two volumes in a year and dedicated them to his intellectual hero, the historian Francis Parkman.

*As Western scholar, TR wins again*

This first installment of *The Winning of the West* redoubled his youthful fame as a historian and scholar. It also proved that he was a storyteller of great natural gifts. The first edition sold out within a month.

Not surprisingly, some of his less successful colleagues were envious and critical. James R. Gilmore, a historian whose own works had been rendered obsolete by *The Winning of the West*, published a review in the New York *Sun* accusing Roosevelt of plagiarism and fraud. "It would have been simply impossible," Gilmore sniffed, "for him to do what he claims to have done in the time that was at his disposal."

TR annihilated Gilmore in an open letter too long to quote here—unfortunately, for it is a classic ex-

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When big-game hunter Roosevelt's name came up in a New York mayoral campaign, a wry cartoon resulted.

ample of that perilous literary genre, the Author's Reply. It ends: "I hereby offer a thousand dollars . . . to anyone who can show that ten lines of [*The Winning of the West*], notes or text, were written by anyone but myself. . . . The original manuscript of the book is still in the hands of the publishers, the Messrs. Putnams, 27 West 23rd Street, New York; a glance at it will be sufficient to show that . . . the text and notes are by the same hand and written at the same time."

Gilmore did not take up the challenge, but I did, 90 years later. The manuscript had long been considered lost, but since I have the same publisher, I thought there was a chance it might be found buried in the corporate vaults. I searched in vain. Then one day, quite by chance, I came across a misfiled card in the manuscript department of the New York Public Library. And there, perfectly preserved but for a few missing pages, was the holograph of TR's great work. Text and notes were indeed "by the same hand."

It is moving for any writer or scholar who benefits from today's word-processor technology to see what agonies that manuscript cost the future President. Paragraph after paragraph is scarred and blotted and scrawled over; interlineations crowd claustrophobically between the scratched-out sentences; balloons full of new words soar to the top of the page, like blimps over burned-out forest. Writing was indeed "horribly hard work" to Theodore Roosevelt, and nobody can begrudge him the scholarly praise he earned.

His next few books, aside from Volumes 3 and 4 of *The Winning of the West*, were remarkable more for quantity than quality—"I don't mean to do one single thing this month," he told his sister, "except write a life of Oliver Cromwell." His public career was burgeoning again, distracting him from literary labor; conversely, the animal exhilaration of trampling on political enemies affected his prose, making some of it unpleasantly aggressive, not to say downright cruel. His attacks on American expatriate writers and artists ("men too weak to make their way at home") grew steadily shriller. Henry James was singled out for particular contempt. The mild-mannered novelist was at various times described as "a little emasculated mass of inanity," "a miserable little snob," and "an undersized man of letters," suffering from "delicate, effeminate sensitiveness." James did not reply in kind. "The national consciousness," he sighed, "is for Mr. Theodore Roosevelt a very fierce affair."

Roosevelt wrote with equal contempt of mugwumps, pacifists, anti-imperialists, and those most epicene of perverts, the Democrats. He had a lamentable tendency to castrate such foes metaphorically—"beings whose cult is nonvirility," "sublimated sweetbreads," "a small body of shrill eunuchs."

In fairness it should be noted that TR was a superabundant personality in every sense, like an avalanche in his loves as well as his hates. He did everything to excess, simply because there was, as Edward Wagenknecht has remarked, "so much of him." Finley Peter Dunne was appalled by the energy with which he kissed babies, and predicted that a whole generation of Americans was going to grow up scarred like German university students. The naturalist John Burroughs complained, "He killed mosquitoes like lions, and lions like mosquitoes." When TR read a magazine he literally tore his way through it, ripping out each page and crumpling it on the floor, while the contents registered in his computerlike memory.

### *Rough Riders and rougher reviewers*

Another fault was his excessive use of the personal pronoun—13 times on the first page of *The Rough Riders*, for example. When this swashbuckling account of his experiences as a cavalry colonel in the Spanish American War came out in 1899, newsman Dunne's vernacular columnist, "Mr. Dooley," suggested in a famous review that the book should have been called *Alone in Cuba*. For the rest of his life Roosevelt endured the compliments of readers who told him *Alone in Cuba* was one of their favorite books.

Roosevelt's literary output was limited during the Presidency to occasional essays and reviews. Then, after leaving the White House in 1909, he embarked on a major zoological safari for the Smithsonian Insti-

tution. His account of that trip, *African Game Trails*, was a massive best-seller and contributed to the affluence of his later years. It and *Through the Brazilian Wilderness* (1914), a similar volume describing his exploration of the River of Doubt (a tributary of the Amazon), are still regarded as classics of their kind.

Little need be said of Roosevelt's other post-Presidential writings, most of which were didactic and ephemeral. Only three splendid chapters in his *Autobiography* (1913) are worth reading for their moving accounts of his boyhood, home life and cowboy years ("It was still the Wild West in those days . . . ours was the joy of work and the glory of living").

TR's lust for life—he preferred the Italian phrase *vigor di vita*—lasted until the death in battle (in France, in August 1918) of his beloved fighter-pilot son, Quentin. That grief made Roosevelt prematurely old at 60. But he kept writing to the end, not laying down his pen until January 6, 1919. His final scribble of that date is touchingly similar, in its round, schoolboyish characters, to the handwriting of little "Teedie" Roosevelt, half a century before.

In a rare moment of repose, TR rests with dog and book on Colorado hunting trip. An impatient reader, he tore through magazines, ripping out page after page. As writer, too, Roosevelt was always in a hurry.

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*By Peter Chew*

# 'Mules is born in a man; you ain't gonna get it out of him'

*Long bad-mouthed for cussedness, mules are in fact tough, smart, strong—and making a fast comeback today because they are fun*

The old mule: wearing blinders, a team of draft mules does field work in San Marcos, Texas.

Has a secret colony of mules seized control of our destiny from somewhere in outer space?

NBC-TV's *Saturday Night Live* once posed this question. Well, television gag writers aside, the mules are having the last laugh these days. Consigned to the "killer man" for slaughter when tractors growled across the landscape in the late 1940s, the mule has come back from cast-off beast of burden to popular beast of pleasure.

More intelligent than the horse and far tougher physically, the long-eared, shave-tailed mule is sharing at last in the nation's wealth, which mules of yesteryear did so much to create by what was often brutal, life-shortening toil.

A mule is the sterile, hybrid offspring of a male donkey—or jackass—and a female horse, which was once bred selectively for work in the cotton fields of Mississippi, the sugar plantations of Louisiana, the coal mines of West Virginia and every imaginable form of heavy draft work. Today, hobbyists modify the animal's breeding to produce riding, driving and racing mules. Ways of having fun with the New Mule are limited, it appears, only by the human imagination.

"The modern mule is being asked to do everything a horse does, and he does some things better than a horse," notes Betsy Hutchins, editor of *The Brayer*, published by the 2,000-member American Donkey & Mule Society in Denton, Texas, which boasts 40-odd affiliates such as Montana's American Council of Spotted Asses and the Oregon Mr. Longears Club.

Trail riding and trail driving in covered wagons are popular mule activities. Mules are competing in their own rodeos, gymkhanas, hunter-hack and Western classes modeled after horse shows. They take part in multiple-hitch classes and weight-pulling contests; they race with jockeys up; they race with chariots behind. They jump fences with riders aboard; they jump riderless. Mules have become skilled at working cattle on ranches.

Mrs. Edith Harrison-Conyers of Winchester, Kentucky, rides to hounds on Kit, her five-year-old mule (p.100), a fearless jumper that finished seventh in the Mumford Farms Horse Trials in Evansville, Indiana, last May, clearing every cross-country and stadium jump, scoring well in dressage and finishing ahead of 11 of the 18 horses in the grueling three-phase event. But people also buy mules just to have them around. They want to see their long ears sticking up in the near distance and to hear the music of their braying.

At the big Reese Horse & Mule Company auction last winter in Columbia, Tennessee, when 800 mules and jacks went under the hammer, an aging mule man in bib overalls talked about the mystique of mules during a break in the bidding. "Years ago, every little farmer with half an acre of tobacco would have a one-

The classic mule: matched pairs are judged for color, size and conformation at Missouri State Fair.

The new mule: Cathy Wieschoff takes Kit over a jump. Kit regularly competes against horses.

Winfred Speed of Clayton, Georgia, rides Jezebel like a horse, but doesn't shoot from her back.

line mule to do the work, but people today have got a job in a factory or office someplace," said John C. (Tennessee) Miller, a prominent breeder of prize draft mules. "It's more or less a hobby. Mules is born in a man, and you ain't gonna get it out of him."

Miller, too, has an office that is supporting his mules. He is the multimillionaire president of Frontier Companies of Alaska, Inc., and many other firms. He commutes between his headquarters in Anchorage, where he has mules, and a farm not far from Columbia, Tennessee, where he has more mules.

Melvin Means, president of the Ruidoso Downs Mule Skinners Association of Ruidoso, New Mexico, claims that "Mule racing is the fastest-growing sport in the Southwest." Ruidoso Downs is the home of the world's richest horse race—a $2.5 million event for quarter horses—and the world's richest mule race, a 350-yard dash for a $10,000 purse. And some of these mules can pick 'em up and lay 'em down. They cover 350 yards in 20 seconds.

Jim Lackey, chairman of the Bishop, California, Mule Days Celebration, which includes mule races of more than a half-mile, says: "They come down past the stands the first time running like hell. They run on around the clubhouse turn and down the backstretch. But when they round the turn into the top of the homestretch, some of the mules just stop. They've run as far as they want to, and that's that. Mule men generally agree that mules are smarter than horses."

Bishop is the undisputed "Mule Capital of the World," a small resort community in the lush Owens Valley in the shadow of the High Sierras, 300 miles northeast of Los Angeles. There, 4,000 residents and 1,000 pack mules live in harmony with tourists and summer vacationers.

*Firing skyward like a missile*

Raccoon hunting on muleback, which usually takes place at night, is a tradition in places such as Arkansas, Missouri, Tennessee and Kentucky. Mules have always been the hunters' transportation of choice. Gunfire does not faze the animals once they have been trained. The little mules are nimble of foot and adept at jumping the barbed-wire fences that crisscross the country. When coming upon a fence, the rider dismounts, drapes his jacket over the top strands and lets the mule size up the obstacle. The rider goes to the far side of the fence and tugs on the reins. The mule then sinks down on his powerful haunches, tucks in his front legs —and fires himself skyward like a missile.

Mules have minds of their own, and things do not always go according to their handlers' plans in more formal jumping contests. Sometimes a mule will rub its chest up against the fence to gauge its height, start

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Picking 'em up and laying 'em down, mules pound toward finish wire at Ruidoso Downs, New Mexico.

Mule racing is growing fast, and no wonder—for this 350-yard dash the purse amounted to $10,000.

to sink down in readiness to jump—then change its mind and walk under or around the obstacle in question while the crowd laughs and its handler fumes.

Endurance riding on mules is a growing sport. In 1976, some 100 riders, 175 horses and five mules (each rider was allowed to bring a spare mount if he or she wanted to) took part in a race from Frankfort, New York, to Sacramento, California, a distance of 3,200 miles. A 60-year-old Californian named Virl Norton finished first, in 98 days, with his mules Lord Fauntleroy and Lady Eloise, both of which were 16-hand animals out of thoroughbred mares. After Norton picked up the $25,000 winner's check, some of the horsemen complained about how the race had been run, so Norton offered to race them back to New York for a $10,000 ante—winner take all. There were no takers.

Conformation, or halter, classes for draft mules are a fixture at state and county fairs (p. 98 ). A consistent winner in Kentucky is Ralph Higginbotham of Monticello, a protégé of Tennessee Miller, who ships his Belgian draft mares to Higginbotham's farm each spring to be bred to jacks.

Generally speaking, the conformation of a mule presents the body of a horse on the legs of a donkey. A mule's back is flatter than that of a horse, and its withers almost imperceptible. Head, ears and tail are those of a donkey, or ass. And a mule's foot is smaller than that of a horse, although a draft mule is expected to have a big foot. A mule should have clean, straight legs, an alert eye and erect carriage.

"A good mule is like Lulubelle," said Higginbotham recently at his farm, leading her out of the barn for display (p. 108). "Everything comes out just right."

Lulubelle is a two-year-old, foaled by one of Higginbotham's 16 Belgian draft mares; she is by Henry, an irascible 11-year-old jack, one of three on the farm. A sorrel with flaxen, roached mane and flaxen tail, Lulubelle already stands nearly 16 hands and weighs more than 1,300 pounds. Today, the most fashionable draft mules are "blond" sorrels, a soft, tannish color. Lulubelle is a reddish sorrel and this bothers Higginbotham. "Ain't but one thing I would change about Lulubelle: if she had the blond color, she'd be perfect."

When the oil crisis hit a few years ago, draft horses began to come back, and their prices rose accordingly (SMITHSONIAN, February 1980). To a lesser extent, this has happened with draft mules, although good ones remain in precious short supply. Higginbotham has a pair of rare young, steel-gray mules for which he has turned down $7,500. And a few years ago at a sale in Waverly, Iowa, a pair or "span" of draft mules was knocked down for $15,000. However, the prime draft-mule market these days rises and falls with the prices that Amish farmers—the largest group of mule buyers—receive for their tobacco, and prices have been off the past two years. (Similarly, the Missouri mule market ebbed and flowed with cotton prices in the Gulf States before and after the turn of the century.)

*Peter Chew wrote about the return of the draft horse in* SMITHSONIAN, *February 1980; he is now working on a book about the Thoroughbred.*

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In the South the indispensable mule helped plow cotton fields, then hauled the bales to market.

A 1905 poster advertises the popular cleanser, although by then mules were no longer hauling it.

So at the Reese sale in Tennessee last winter, draft mule pairs went for an average of $2,500, down considerably from recent years.

Even more so than Tennessee Miller and Ralph Higginbotham, Melvin Kolb of Lancaster, Pennsylvania, looks the part of a mule man. A big man who loves to eat, he dozes through mule auctions, a long whip cradled in his hands, seemingly out of the action. But when the auction is over, he has somehow managed to make the top bid for many if not most of the best mules.

Like his late father before him, Kolb sells mules to the Amish, scouting sales and farms in half a dozen states. The Amish generally do not breed and raise their own mules because their land—which ranges in value from $3,500 to $6,000 an acre—is too valuable to devote to the animals. Normally, Kolb buys at least 100 mules at the Columbia sale; this year he bought only 70, with 21 of them from Tennessee Miller in a $45,000 private deal outside the sales ring.

When pricing a mule, you must consider that your mule will never be able to reproduce himself or herself. A male or "horse" mule is born sterile, although he has genitals and must be gelded, for he has the instincts and drive of a stallion. Similarly, a mare or "Molly" mule comes in heat, but if bred to a stallion or jack either will not conceive or will abort.

Hinnies, which are the offspring of stallions and female donkeys called "jennets" or "jennies," also do not bear offspring. These creatures are fairly rare and are smaller than mules. Overly simplified, mules and hinnies cannot reproduce themselves because they lack the proper number of chromosomes, those bodies within sex cells that must match up, perfectly, two by

Mules were also indispensable in Italy in World War II. This is a British Eighth Army pack train.

Harry S. Truman, son of a Missouri mule and horse dealer, communes with team of his "favorite" animals.

two, before new life can be created. An ass or donkey has 62 chromosomes or 31 pairs; a horse has 64, or 32 pairs; while a mule or hinny is the odd-animal-out with 63 chromosomes.

There are two other equine species: *Equus zebra* and *Equus hemionus* or onager, a nearly extinct wild ass known for its ferocity. *Hemionus* is the Greek word for a "half-ass." Donkeys have been successfully bred to zebras, with the offspring known as zebronkeys.

The quirky character of the mule has been shaped in the course of 3,000 years on Earth as a faithful servant of Man, who has alternated between abusing and ridiculing the animal, and treating it royally, as Nero supposedly did when he fitted out his mules with silver shoes and other grand accoutrements.

It is hardly surprising that the mule instinctively eyes Man with suspicion. A mule *can* be stubborn, and a mule *can* kick your brains out, but these propensities have been exaggerated beyond reason, say mule men. A mule will kick when provoked or frightened, but so will a horse. Horses can be stubborn, too.

When I was a boy, we had a sweet old mule named Alice on our small farm in the Shenandoah Valley of Virginia, but you could ride her just so far across the fields and through the apple orchards before she would stop in her tracks. Through trial and error, however, I discovered that if I dismounted and led her quickly around and around in a tight circle, then remounted and headed her back, she would trot along happily enough—until she decided to stop again.

During a mule race at the Berryville Horse Show one summer, a neighbor's mule that I was riding stopped dead still in front of the grandstand—a mortifying experience. I hopped off, led the animal around in a circle, jumped on and, sure enough, the mule galloped on. But the rest of the field had passed me by.

A mule's temperament depends in great measure upon the temperament of its dam, and on how it was treated when it was young. Today's draft mules inherit the placid dispositions of the Belgian draft mares that give them birth, and breeders of sport mules are careful to choose mares with gentle dispositions.

We speak of "horse sense" when we should, more properly, speak of "mule sense," for common sense is the mule's greatest asset. If, for example, you turn a hungry mule loose near an open corncrib, it will eat until it is satisfied and then stop. Neither will it founder from overdrinking. Under the same circumstances, a horse is likely to go on eating until it becomes ill. If you overload a pack mule, it will buck the load off or refuse to move. A mule knows what it can carry and what it can't carry. If a mule becomes tangled, say, in barbed wire, it will wait patiently for someone to come along and extricate it. A horse in the same fix is likely to tear its hide apart in a panicky effort to get free. A mule can stand the heat better than a horse, is stronger pound for pound than a horse, and is heir to far fewer ailments than a horse. A mule is what farmers call "an easy keeper," an animal that is cheap to maintain.

Mules are notorious for learning how to open gates, barn doors and the like. A Wyoming rancher recalls a team of mules that worked together to open gates: one mule would lift the sliding wooden bar with its nose, while the other mule nudged the gate open.

The surefootedness of the mule is legendary. Since the turn of the century, mules have been carrying tourists (many, if not most, of whom have never ridden any

kind of animal before) down the steep, narrow trails and switchbacks into the Grand Canyon, a distance of ten miles. Interestingly, there has never been a single human fatality, although some pack mules and some mules that were being trained have plummeted to their own deaths.

There is a threadbare saying that the mule is "without pride of ancestry or hope of posterity." Not so. The mule and the donkey have been celebrated in song and story and in art form, from Homer's *Iliad* to Balaam's talking ass; from the ballads of black sharecroppers in the American South to the rhythmic clip-clop of mule hooves in Ferde Grofé's *Grand Canyon Suite*; from ancient Greek pottery to the 20th-century paintings of Thomas Hart Benton.

*The mule as a prime energy factor*

Greek and Biblical writings indicate that mules first walked the Earth in Asia Minor some 30 centuries ago; it is not known whether they arrived by human design or natural brief encounter. One theory holds that mules were first bred in Cappadocia, which is now central Turkey. For more than a hundred years—throughout the 19th century and well into the 20th—the mule's presence was pervasive in the United States, specially so in the Southern and border states, in the cotton fields and on the sugar plantations.

"From one-mule farms in the hill country to Delta plantations with hundreds of teams, the mule for over a century was the prime energy factor in Mississippi's agriculture," notes Patti Carr Black, director of the Mississippi State Historical Museum, in the book *Mules and Mississippi.*

George Washington, no less, had foreseen all this and realized what a boon mulepower would prove to be for our agrarian economy. He had said in the early 1780s that the American farmer needed "an excellent race of mules," and he set about establishing one. There had been donkeys and mules in this country since the days of the Spanish explorers, but they were of indifferent quality and little more than curiosities. In Washington's day, Spain possessed the finest jack stock in the world: huge, powerful animals from Andalusia and Catalonia. Farmer Washington was determined to get his hands on some of these beasts even though the Spanish guarded them jealously and forbade their exportation.

"Nevertheless, by 1784, the name Washington meant something even in the courts of Europe and soon word of his quest reached the King of Spain through somewhat irregular diplomatic channels," notes John Rhodehamel, archivist of Mount Vernon, in *Fairfax Chronicles.* "Hoping to win the goodwill of the foremost citizen of the strange republican nation across the Atlantic, Charles III . . . caused two fine Spanish jacks [and two jennets] to be dispatched at once to George Washington, farmer."

James Clark rides a two-row corn planter behind a pair of handsome white mules in central Kentucky.

In 1785, a leggy 16-hand Andalusian jack, which Washington named Royal Gift, arrived at Mount Vernon—and proved an immediate disappointment at stud. He was a "shy breeder," and could be coerced into mating with only two or three of the more than 30 mares that Washington had assembled for his court. The Spanish jack, wrote Washington, "was perhaps too full of Royalty to have anything to do with a plebeian race." By the next year, however, Royal Gift had redeemed himself. Farmers from up and down the East Coast sent mares to Mount Vernon, and Washington eventually sent Royal Gift on a triumphant 1,000-mile breeding tour through the Southern states.

Soon after, Washington acquired two jennets and a smaller jack from Malta, which were sent to him by the Marquis de Lafayette. The second jack, christened Knight of Malta, proved to be better suited for the breeding of saddle mules, while Royal Gift was able to sire mules for draft work. When Washington died in

The Clarks also use tractors on their farm, but "mules don't pack the ground like a tractor."

1799, nearly 60 mules were grazing at Mount Vernon and America did indeed have the beginnings of "an excellent race of mules," the world's best, in fact.

In 1890, the mule population of Missouri stood at 245,273, the highest in the nation, according to U.S. Census figures. Texas, which had developed its own cotton fields, took the lead in 1900 with 474,737, reaching an all-time high in 1930 of 1,040,106. Texas absorbed its own mules, whereas Missouri shipped its mules in vast numbers throughout the United States and the world at large.

Missourians produced and marketed mules the way Detroit would produce cars and trucks when the combustion engine became a reality.

Luke McClure Emerson, born in Pike County in 1860, was Missouri's most celebrated importer and dealer. He was known to carry as much as $80,000 cash in his pocket, buy wholesale lots of mules sight unseen and boast that all he needed to see of a jack, in order to judge him, were his head and ears. Emerson was a showman with a talent for publicity. In January 1894, nearly 100 of his Spanish jacks reportedly escaped into the city of Liverpool, England, while being loaded from one steamer to another in the harbor. The jacks were rounded up by police but when they reached New York they escaped again, mysteriously, one of them falling into a well ten miles outside the city. In April 1911, when Missouri's Champ Clark was elected Speaker of the U.S. House of Representatives, Emerson drove him down Pennsylvania Avenue in Washington behind a pair of mules named Belle of Pike and Belle of Callaway.

A firm by the name of Guyton and Harrington in Lathrop, Missouri, which won an exclusive contract to provide horses and mules to the British Army during the First World War, operated on a scale that tests credibility. On a 15,000-acre tract, with access to four railroads, as many as 50,000 horses and mules were assembled at one time. The company supplied an estimated 350,000 horses and mules to the British Army.

The American Army in World War I procured nearly 160,000 mules, many thousands of which were lost to bullets and shellfire in France. Tens of thousands of mules served American and British forces as pack ani-

Ralph Higginbotham of Kentucky wishes Lulubelle were more blond, but otherwise she's "perfect."

mals in Italy during the Second World War (p. 105 ).

Donald Willems of Portland, Michigan, was the American Fifth Army's pack troop and remount officer in Italy, with hundreds of men and 40,000 mules under his command—American mules and mules captured in the Po River Valley and elsewhere. Now 65 years old, Willems remembers his mules vividly and with affection. "Once they were settled in, they didn't panic," he recalls. "We would go in at night and take materiel up to the units in the line—ammunition, 75-millimeter gun barrels, food, medical supplies, demolition wire—up where trucks and Jeeps and even bulldozers couldn't go, up in the mountains in snow and mud." But when the Germans zeroed in on the pack train with heavy mortars, the men could hit the ground or take cover, while the mules could only stand still. Thousands of Willems' mules were wounded and killed in the Italian campaign.

Apart from war service, the most dramatic episode in the history of the amazing American mule concerns the 20-mule teams that hauled huge freight wagons loaded with borax 165 miles across California's Death Valley in the 1880s. In each train were a 1,200-gallon water-tank wagon and two freight wagons 16 feet in length with rear wheels seven feet in diameter; each freight wagon weighed four tons and was capable of carrying 36 tons of cargo.

"The life of a teamster on the desert is not only one of hardship, it is in places extremely dangerous," wrote John R. Spears, a New York *Sun* reporter from Death Valley in 1891. "There are grades, like the one on the road from Granite Spring to Mojave, where the plunge is steep, the roadbed as hard as a turnpike. The load must go down, so when the brink is reached, the driver throws his weight on the brake of the front wagon, the swamper [assistant] handles the brake on the rear, and away they go, creaking, groaning and sliding, until the bottom is reached.

"If the brake holds, all is well, but now and then a brake-block gives way, then a race with death begins. With yells and curses, the long team is started in a gallop, an effort is made to swing them around up the mountainside, a curve is reached, an animal falls, or a wheel strikes a rock or rut, and, with thunderous crash, over go the great wagons."

It is about 150 miles from Death Valley to the Owens Valley and Bishop, California, where the modern mule lives a quite different life. But we shouldn't begrudge today's mules their good times: they have paid their dues.

Lucky Jonathan Chipman of Perry, Missouri, has a three-month-old mule colt, Susie, for a pet.

# Peugeot reinvents the large station wagon.

**It is larger than the best-selling American, European, or Japanese wagons. Yet, uncannily, it handles exactly like a sedan.**

Small wagons are sort of cute. But, as Mom ("The Chauffeur") ruefully discovered, it takes a heap of wagon to hold all her members of the boom-and-blast brigade. And the sousaphone. And the trombones. And the earthquake drum.

After sizing things up with a critical eye, Mom went for the big new Peugeot wagon. Which has almost 80 cubic feet of cargo space—absolutely flat, uncluttered space. And can tote over half a ton of whatever.

Since then she's discovered a few things about the Peugeot that she *didn't* expect. The back seat, for instance, is higher than the reclining seats up front. That's so Peugeot could give the passenger in the middle a nice, thick, deep seat to sit in; no one rides third class in a Peugeot. And there's not a single spring in any of the seats—springs are too bouncy for Peugeot's taste. In their place is expensive polymerized foam, which produces armchair-like seats that have been described as "almost sinfully comfortable." The Peugeot is very definitely a wagon for comfort of body.

*A wagon that handles like a sedan should be as comfortable as a sedan. Seats of soft, supple leather are available at extra cost in the 505 S.*

It's also a wagon for comfort of mind. This is one big wagon that is designed *not* to wag its tail clumsily from side to side. More than one person has remarked that you'd never know it was a wagon at all if you didn't look over your shoulder and see all that space back there.

# The all-new Peugeot 505 S

You can have a Peugeot wagon with vinyl seats, velour seats, or, at extra cost, leather seats. A fuel-injected gasoline engine or a turbocharged-diesel engine. Very well equipped or extremely well equipped. Prices range from $11,990 to $17,965.*

If you'd like to know more, please call 1-800-447-2882 toll free anywhere in the continental U.S. for a facts-filled brochure and the name of your nearest Peugeot dealer.

*Based on P.O.E. manufacturer's suggested retail prices. Actual prices may vary by dealer. Destination charges, taxes, dealer preparation, if any, and license fees are extra.

PEUGEOT

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BY APPOINTMENT
TO HER MAJESTY THE QUEEN
SUPPLIER OF NOSEGAYS

*By Israel Shenker*

# Warrant holders: England's royal families of trade

*Through the centuries, Britain's crowned heads have been served by appointed purveyors of goods from fish to nosegays*

The Queen and attendants carry Mrs. Bennett-Levy's nosegays as they emerge from Royal Maundy service.

Henry II (1133-89) extended England's rule to half of France, but his domestic arrangements suffered. His bread was baked with beer dregs, his wine was vinegar, his meat rotten, his fish decayed. In frustration, so it's said, he would chew the carpet, and in wall-to-wall tantrums he would begin to stuff his mouth with mattress innards. By fits and starts, Henry was headed down the slippery slope to history's footnotes.

But about 1155 he confirmed a nascent tradition of British life by granting a Royal Charter to the Weavers' Company. By this act the Crown conferred a special right and sought to ensure that the King's—and public's—goods were fit for consumption. With the passage of years and reigns, deserving individuals were named suppliers to the sovereign, with Royal Warrants testifying to the privilege. Henry VIII appointed Thomas Hewytt "to serve the Court with Swannes and Cranes," and directed Anne Harris "the King's Laundresse . . . for her paines be paid £1 10s. a yeare, without further charge for wood sope, or any other thing."

James I, of whom it was said that "he hunted everything that ran and knighted everything that crawled," helped introduce golf to England; the Crown would appoint a Goffe-club Maker, an Operator for the Teeth, a Corn Cutter. Later came a Pin Maker, a Rat Catcher and a Mole Taker. Queen Victoria, who knew the value of everything and the price of nothing, named warrant holders by the score, including a Worker of Bookmarkers, a Modeller of Wax Flowers, and half a dozen opticians (though the wearing of spectacles was undoubtedly frowned on at court).

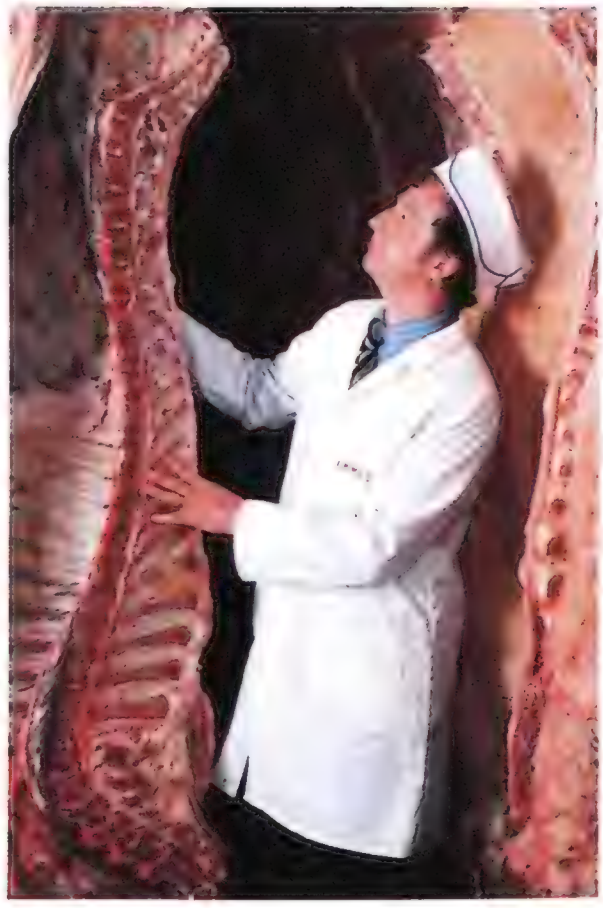
In the present reign, tradesmen may apply for warrants when they have supplied "substantial" goods or services to the Royal Household for three years. Warrant holders tune the Royal pianos, repair the Royal clocks, thatch the bungalows at Sandringham estate and rebuild the ancient, regal stone walls at Balmoral. They provide the Royal beef and Royal fish, encase the Royal tums in corsetry and swathe the Royal limbs in kilts. Warrants are valid for ten years, and renewable with good service and good behavior. The Royal Household pays for purchases, though the Queen and her family generously accept gifts as well. There are about 800 Royal Warrants outstanding, three-quarters of them granted by the Queen, the others by the Queen Mother, the Duke of Edinburgh and the Prince of Wales. About 25 warrant holders have enjoyed the distinction continuously since Victoria's reign, and a few, such as Broadwood (pianos) and Thresher & Glenny (shirts), since the 18th century. Warrant holders may display the Royal Arms, provided that, on containers and vehicles, when viewed from any angle, only one reproduction is visible. The Arms must not be a component of a building, lest a

Royal Arms adorn cottage of Valerie Bennett-Levy, maker of Queen's nosegays. Her services are free.

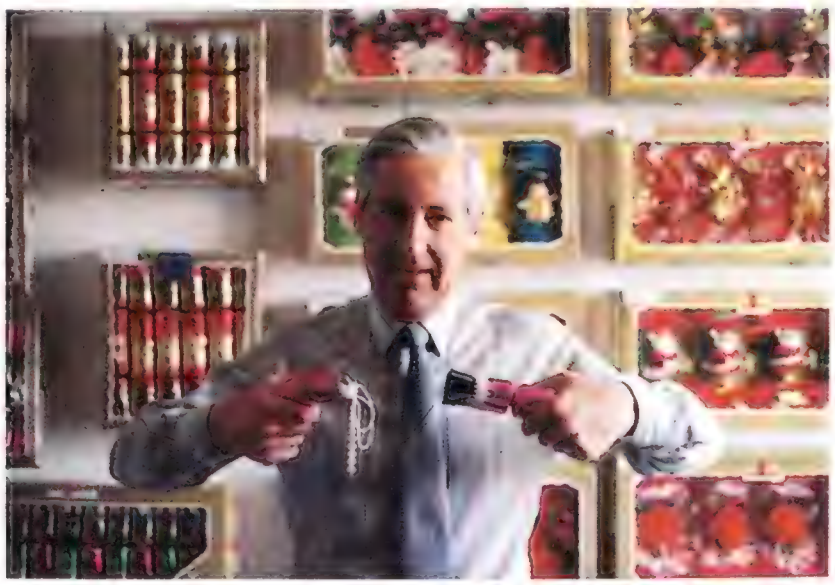
*Photographs by Bryan Alexander*

At Gibson Saddlers, Pam Cornwell folds a set of Queen's racing silks.

Edward Joslin of Spink & Son Ltd. provides the medals for Royal Family.



Aberdeen Meat Marketing Ltd. has warrant to supply beef and lamb.



Tom Smith & Co., Ltd. has supplied Christmas crackers—party favors—to the Crown since 1906.

James Mackie of Wilson & Son, Edinburgh, keeps Royal Household's pianos in the best of tune.

warrant holder stripped of the honor must have the building dismantled in order to remove the insignia.

Royal Arms dominate the front door of a cottage in Haslemere, Surrey, where Valerie Bennett-Levy is Supplier of Nosegays to the Queen. On Maundy Thursday, the day before Good Friday, the Queen carries a nosegay in a ceremony harking back to Christ's washing the feet of His disciples the night before His crucifixion. Over the centuries, sovereigns have followed Christ's example. James II "was'd, wip'd, and kiss'd the feet of 52 poor men with wonderful humility." But there is no washing, wiping or kissing for Elizabeth II; nor does she follow the old tradition of giving away cloth for suits and shirts, let alone salmon and pickled herring. However, the Queen still distributes specially minted Maundy money to men and women honored for Christian service, and she still carries a nosegay, a custom introduced, apparently at the time of the Plague, to overcome noxious odors.

Mrs. Bennett-Levy's husband was director of a pharmaceutical firm which had the Royal Warrant for nosegays. When the company acquired a Ford dealership, he told his colleagues: "It isn't going to help you sell motor cars to have a Royal Warrant for making nosegays." His wife, an artist who had already been making the nosegays, soon took over the warrant.

In Holy Week, with fresh flowers and herbs contributed by friends, and with doilies, wires, scissors and empty jam jars, she travels to the town whose cathedral will host the Maundy gathering. "On arrival at the hotel near the cathedral, there is a big reunion of everybody from the year before," she says. "They all

Rigby and Peller, corsetmakers, hold a Royal Warrant from Queen.

George Farman thatches roofs for the Royal estate at Sandringham.

Bill Moir of Aberdeen keeps 70 clocks at Balmoral ticking properly.

go to bed—we stay up." With volunteer helpers—her two sons and daughter, plus the son of the secretary to the Royal Almonry—she takes over the hotel kitchen. Working till five in the morning, she constructs 12 to 18 floral mounds of nine-inch diameter (seven-inch for the children who assist at the ceremony). She knows her flowers crest to root, but not formally: "I made a vow that I wouldn't learn the official names. I couldn't stand those pompous people who go around spouting the Latin names at you."

Some who see her Royal Arms try to order nosegays from her. She politely declines. "I may be the only nonbusiness warrant holder," she says. "I do this for pleasure—it's not paid." Her joy would be complete if she could only smell the flowers, but in 1970 she lost her sense of smell, and the fragrance of her Royal nosegays is only a memory.

Of course the supplier of the sheepskin purses to hold the Maundy money also has a Royal Warrant. "It's a prestige job," says James Douglas of Barrow Hepburn Equipment Ltd. Happily, Barrow Hepburn has other strings to its bow, though no warrant for them. It is big in safety equipment, muzzles for Ministry of Defence guard dogs, baton scabbards, machete sheaths, government dispatch boxes fitted with "prison-door screws" that can be screwed in but not out, bullion bags, and—when capital punishment is legal—hangman's straps to tie the condemned. For the Shah of Iran the company did 400 sets of saddlery and accoutrements. A military officer arrived and presented Douglas with a beautifully wrapped parcel. It rattled. "I thought: he's given me the crown jewels," Douglas

Albert Batteson displays Knight of the Garter mantle at Ede & Ravenscroft in London.

*By appointment to . . .*

recalls with alacrity. "But they were pistachio nuts."

The firm sells collar boxes to the royal robe makers, Ede & Ravenscroft. These venerable tailors go back to 1689, and have supplied robes to the past 13 British sovereigns. "We do all the orders of chivalry," says Albert Batteson. "If you are made a life peer it's going to cost you £1,100 for a robe with ermine, £850 with white rabbit. We do chancellors of university—a damask robe. A lot of velvet for facing on a town clerk's robe. We supply the livery companies—the basket weavers and the builders and the wire-pullers. A fully trimmed gold robe—you're talking about £5,000. We're dealing with a bracket of people that thankfully still has enough money. One of our managing directors almost had a nervous breakdown over the coronation—finding enough velvets and ermines and coping with the quantities required in time allowed. If there's another coronation, I'll be away."

The company is a leading supplier of legal wigs—barrister's, judge's bench wig and judge's full-bottomed wig for state occasions. A full-bottomed wig costs a hair-raising £600. "It's 40 yards of curls, and they're handmade, and the damned things last so long they're almost indestructible," says Batteson. "We should build an explosive device to blow them up after 25 years. The hair is from horses' manes and tails, big nasty hanks, most of it imported from Japan. We've not been able to pinch any hair from the Queen's horses—too many American tourists around. We've never used synthetics. Nylon wigs will retain heat, and they look what they are—plastic. Makes me cringe."

Ede & Ravenscroft confines itself to the secular line, leaving religion to Thomas Pratt & Sons, Royal Warrant holders for ecclesiastical robes. June Tyler is managing director there. "The Ravenscroft Royal Warrant was held by my mother, by my brother after her, and by my grandfather before my mother."

When Pratt sought a new primate, Mrs. Tyler heard the call. She moved the business from Covent Garden to a spot around the corner from Westminster Abbey, so that clerics could pop in for a fitting between canonical hours. An ordination outfit—cassock, cape, surplice, alb, amice and girdle, three shirts with collars, preaching scarf, four stoles and cloak—comes to £505. With *aggiornamento* all the rage, Mrs. Tyler welcomes synthetics: "You get a choir of horrid little boys, it's easier to throw the lot in a washing machine."

Royal rites are no less the province of Toye, Kenning & Spencer, who furnish gold embroidery for robes secular and religious, and who hold the Royal Warrant as "Suppliers of Gold and Silver Laces, Insignia and Embroidery." On Great Queen Street the company offers a dazzling assortment of jewelry, cutlery, hollowware, medals, badges, flags, plaques, club ties, lodge regalia, embroidered pullovers, key chains, tea towels, tote bags.

Chairman Bryan Toye's family used to be Toyé, French Huguenots who fled religious persecution in 1685. They brought to Britain their skills in lace making and embroidery. "Today we supply tailors with their badges, buttons, epaulets, aiguillettes, bits and pieces for orders of chivalry and for police and fire brigades," says Toye. "We turn suits into uniforms. We did all the bits on Sadat's uniform, and we supply many countries in Africa and the Middle East—they generally require the best quality for their uniforms. We supply regalia to 88 fraternal societies, everything from Masons to Catenians to Rotary. We made the fabric for braces [suspenders] for the States: pink elephants and white donkeys. I think something to do with politics."

The company uses no end of gold wire. One mile of wire weighs an ounce, and the top quality goes into the

Geoffrey Francis, heraldic artist, paints the Royal Arms on everything from carriages to cars.

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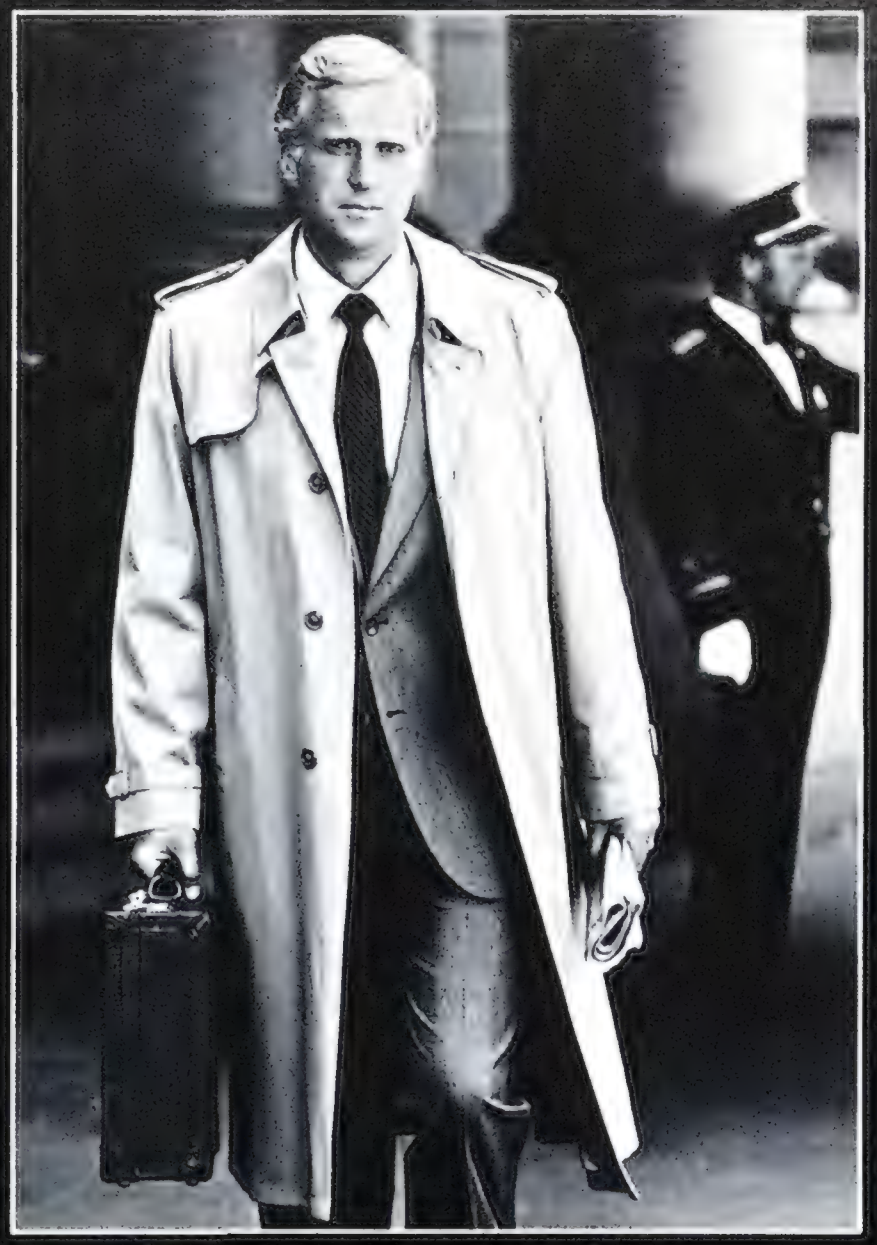
# FIVE TIMES.



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The premier Visa card offers you the most accepted, most widely used name in the world for travel, shopping, entertaining, and cash. Welcome at over 3.6 million places in 156 countries.

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Harry Lindley of Kinloch Anderson, kilt makers, holds Balmoral tartan, worn only by Family.

Lord Chancellor's robes as well as the scrambled eggs on naval officers' caps. "The chap's going to wear it at sea," says Ioye. "The last thing he wants is his peak to go green."

Ioye and four other British medalists constitute a sort of cartel of knighthood: Spink, Garrard, Collingwood and the Royal Mint. All save the Mint—a state enterprise—have Royal Warrants. Spink, which goes back to 1666 and a John Spink, is all but Spinkless now, but it still holds with tradition. "We are responsible for making medals and miniature medals," explains Stephen Dix, "renovating and keeping them in good condition, renewing ribbons and advising when and where to wear them, and in what order." Spink supplies all three classes of the Most Distinguished Order of St. Michael and St. George—the Knight Grand Cross, the Knight Commander and the Companion. (More jocularly, according to their initials: the GCMG is God Calls Me God, the KCMG is Kindly Call Me God, and the CMG is Call Me God.) Spink charges about £1,500 for the GCMG collar and chain, star and sash badge. On the death of a rightful holder, the collar of a first-class decoration must be returned to the Central Chancery of the Orders of Knighthood, in St. James's Palace. Many people receive from the Queen renovated insignia, and are none the wiser. If one of the Queen's own decorations looks a bit green around the gills, an equerry comes round to Spink and has the offender resuscitated.

*Speedy service for the Sultan*

Coronations, jubilees, state visits, and—ever so discreetly—state funerals spread the benison of business. When Sultan Qaboos of Oman was coming to Britain and needed a gift for the Queen, he summoned Edward Joslin, manager of Spink's medal department. Joslin flew to Muscat, and the Sultan's helicopter lobbed him to the desert, where the Sultan was visiting his flock. The two men discussed a suitable decoration, and then Spink rushed it through in five weeks. When he came to London the Sultan proudly presented the Queen with the Order of Al-Said—18-carat red and white gold with diamonds and rubies. He also ordered from Spink 25 medals for the best shots in his army.

For Uganda, Spink turned out the Order of the Source of the Nile, and for Malawi as well as Czechoslovakia an Order of the Lion. The firm has also produced miniatures of the Order of International Tourism, invented by Arizona's tourism bureau. Spink's men compare it to a sheriff's badge.

Arizona should consider awarding one to Thomas J. Crawley, the man who does so much to keep tourism moving. He operates as Mayfair Trunks Ltd., with Royal Warrants from the Queen and her mum. His

"Did I detect a touch of cognac?" he smiled, acknowledging the gift in his usual oblique manner.

I smiled in return.

"Imported" alone would not impress him, I knew. But, ah, to discern the unexpected in cream liqueurs!

Demi-Tasse™ had brought him as close to handsprings as I'd ever seen the man.

What other label could boast the luscious extravagance of natural cream, rich coffee flavor, grain neutral spirits raised to perfection by the elegant touch of cognac?

The result had brought a smile to even these blasé lips.

"Demi-Tasse," he murmured, registering the name forever in his mind.

© 1983 The Paddington Corporation
Imported by The Paddington Corporation, N.Y., N.Y. 34 Proof

Fishmonger Eric Ruffell started out with a pushcart in London's East End, now supplies Royal table.

shop on Shepherd Street is crammed with new and used luggage, and the aura of exotic package tours. The shop echoes to the wail of bereaved tourists bemoaning the state of their Vuittons or keening over the wounds of bargain-basement holdalls.

"They want a miracle," says Crawley, "but they want a miracle cheap and the right to grumble. We're not cheap. We don't want to be cheap. I have to *pay* men, winter as well as summer. Who wants to do repairs? There's not a lot of profit in it. If it were a profitable game, all the big shops would be doing it—Marks & Spencer and Harrods and Asprey's. They'd be on every corner, like betting shops. *I* wouldn't like to have to do the repairs myself, when I see the condition of some of the cases. And we can't guarantee to match handles, fittings, screws, brackets, corners, hinges, locks. You can't renovate a suitcase like you can a house. Once a leather has scars on it, it's like a skin—you can't get them out. And if you tell people that, they get upset. You have to be a diplomat."

When the Royal Family travels, great quantities of luggage are manhandled hither and yon. Back come the casualties, and Crawley puts the rush on. The Royal Family accepts the occasional patch as a fact of life. "An American tourist won't accept it," says Crawley. "I tell them, 'If it's good enough for the Queen, it's good enough for you.' "

Crawley benefits from his strategic location at a crossroads of the upper crust and the economy class, between peerage and steerage, with business coming and going. Most of the top hotels are nearby, and a short stroll away is St. James's Street, where D.R. Harris, at No. 29, features the Pick-Me-Up for king-size hangovers, and proclaims: "This celebrated preparation has, during the last 60 years, received the most distinguished patronage of the English and Foreign Courts." Almost directly opposite, at No. 61, is a dispenser of Royal Scotch, Justerini & Brooks, with another warranted distiller, John Walker, two doors away. Round the corner, the House of Hardy (fishing tackle) casts its line at one end of Pall Mall. Regent Street is chock-a-block with Royal Arms: Garrard, Mappin & Webb ("Silversmiths"), Aquascutum ("Weatherproof Garments"), Hamleys ("Toy and Sports Merchants"), Liberty ("Silk Mercers"). On Conduit Street, Bronnley ("Toilet Soap Makers") is near Collingwood ("Jewellers and Silversmiths").

Britain's Royals have awarded warrants to individual makers of cognac, sherry, kümmel, vermouth and Cherry Heering, two cider makers, two gin producers, nine brewers, nine distillers of Scotch and numerous purveyors of champagne and wine. The Queen Mother has bestowed warrants on two manicurists.

The Queen has long had a soft spot for corgis, and is generous with Royal Warrants for suppliers of dog food, animal health products, kennels and animal bedding (Shredabed Ltd., Exeter). D. & G. Ewers, hardly a mile from Windsor Castle as the crow flies, keeps the Queen in birdseed. Nothing is too good for the Royal horses—or their suppliers. Gidden, Saddlers to the Queen—not to be confused with Gibson Saddlers, Racing Colours for the Queen—displays some of its best products in the windows of its London shop: for the steed it offers hoof oil, lather dressing and show-shine shampoo; for the rider there are hairnets and hip flasks.

A hard canter to the north lives the warrant holder who ensures that all the Queen's horses and all the Queen's men appear to advantage. Geoffrey Francis, now 73, is fourth in a line of heraldic artists, and has been working at his craft since age 16. The palace sends doors from the state carriages to his home, and he paints or retouches their coats of arms in a second-floor back room—northern light. "I've never painted anything except heraldry in my life," he says, "and when I go to an art gallery I'm bored to tears. Have you ever looked at Landseer's animals—*The Monarch of the Glen* and *The Stag at Bay*? One is standing in bracken and the other in water. In both cases the feet are invisible. Landseer couldn't paint a cloven hoof."

Eight times he has crossed the Atlantic to paint coats of arms for American clients. Rolls-Royce flew him to Malaysia to put the chief of state's coat of arms on his new motor car. "Every time I finish a job I think I'll get out the brushes and paint the house," he says.

*A frequent contributor, Israel Shenker last wrote in* SMITHSONIAN *on the Broadway musical* Cats.

# The new '84 Ford Tempo. Technology never felt so comfortable.

**The inside story.**

Tempo's interior is a computer-refined compartment for five. Computer-designed placement of seats, door, roof and window areas afford maximum space efficiency.

Even Tempo's front-wheel-drive configuration was designed to provide more interior room. Since there is no drive shaft, there is no large hump to rob valuable floor space. In fact, Tempo actually has more rear room than a Mercedes 300D.*

For driver's convenience, controls are all placed within easy reach. For added ease, wipers and washer, directionals, high-beams and flash-to-pass are located on the steering column itself.

**Technology that works for you.**

Outside, a unique aerodynamic shape channels the wind over and around Tempo to help increase fuel efficiency. It also directs the airflow, reducing overall lift for improved stability and directional control.

Its front-wheel drive delivers all-weather traction, while its four-wheel independent suspension provides a smooth ride.

Plus, Tempo has the world's most advanced automotive computer, the EEC-IV. It processes up to 250,000 commands per second. Coupled with Tempo's 2300 HSC (High Swirl Combustion) engine, you get quick power response from a standing start and at cruising speed.

**Best-built American cars.**

When we say "Quality is Job 1," we are talking about more than a commitment. We are talking about results. An independent survey concluded Ford makes the best-built American cars. The survey measured owner-reported problems during the first three months of ownership of 1983 cars designed and built in the U.S. And that commitment continues in 1984.

*Based on EPA Interior Volume Index.

**Have you driven a Ford... lately?**

Ford

But there is always another commission still waiting.

Still farther north, in the Scottish village of Ballater, the exclusive shops—if there were any—would be those without Royal Warrants. Thanks to its proximity to Balmoral, Ballater has been flooded with the ornate certificates. Standing in Bridge Street—not much traffic except in summer—one can almost touch four shops bearing the Royal lion and unicorn: Murray the pharmacist; Sheridan the butcher; George Smith, who sells fishing tackle; and his brother, who trades as Henderson's, sportswear outfitters. Nearby are Paterson (bags for Royal vacuum cleaners), Leith (tea and cakes) and two garages (horseless carriages).

Ex-Navy Commander Hugh Faulkner, Secretary of the Royal Warrant Holders Association, is the link between the Lord Chamberlain's office and warrant holders, and he also boasts a second function: "To try to induce in the membership a sense of belonging." This involves a luncheon in June, a banquet in November, and a year-round RWHA tie—gold monogram on navy blue. "Very recently we had a little golf match and a clay-pigeon shooting match against the Royal Household," he says. "We won."

His office faces a side entrance of Buckingham Palace, and is bedecked with photographs of British sovereigns and near-sovereigns who have given Royal Warrants. "The Royal Warrants is a good old bit of English tradition, and it's taken by those who get it as a great honor to be given this stamp of Royal approval," Faulkner suggests. "Those who see it—who bother to recognize it—can be sure of the standard of quality and service. One bloody hell *should* be sure of it. They certainly give excellent quality of service and product to the palace—they should to everybody."

Is there any disadvantage to being a warrant holder? he is asked. "Losing it," he replies.

Robin Fraser Callander took a university degree in geology, but he pursues the life of a "drystane dyker," repairing the old stone walls at Balmoral Castle and at Birkhall, the Queen Mother's estate.

AT&T

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It is AT&T's standard of service, of innovation, of excellence that has created the most extensive, most efficient, most reliable communications system the world has ever known. One that is constantly being refined and expanded.

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We intend to compete for all we're worth. Not just in America, but around the world. We're determined to see to it that America remains the world leader in telecommunications technology.

Tomorrow has come suddenly, but it hasn't taken us by surprise.

We've been preparing for it for 107 years.

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Assembled on a New England hayfield, masks of real people congregate in unusual town meeting. Made for community art project, the masks will go on tour in grass-roots exhibit organized by a regional foundation.

*Article and photographs by Peter Miller*

# In upper Vermont, getting plastered is a face-saving art

*For fun and posterity, 400 folks in a pair of bucolic villages turned masks of their own features into whimsical self-portraits*

Tucked away in the scenic hill country of northern Vermont, the Town of Montgomery contains 681 people, a slightly smaller number of cows and the Trout River, which curls through the hamlet of Montgomery Center and then passes just west of Montgomery proper. The two villages are only about three miles apart but recently the residents were brought even closer together by a joint artistic venture one old-timer characterizes as "getting plastered." First, a local artist made plaster face masks of more than 400 residents. Then, the bemused subjects proceeded to decorate their own likenesses.

The result, an intriguing collection of whimsical self-portraits, will eventually be kept as a visual form of Montgomery's archives. Now, though, nearly 200 of the masks are going off on a grass-roots tour in New England as a full-fledged exhibition being sponsored by the New England Foundation for the Arts in Cambridge, Massachusetts. The purpose, explains the foundation's director of visual arts, Marie Cieri, is "to show people in other towns how they, too, can get personally involved with art."

*Town has a ball with its masks*

Montgomery artist Maggie Sherman "masks" Calla Maloney. Plaster strips go on after face is greased.

The plaster sets in about five minutes. Then, mask is peeled off, and Calla regards her face with amusement.

Maggie Sherman thought up the mask idea one winter. A self-taught textile artist, she had made some masks for Montgomery's previous Fourth of July parade. When a friend later suggested that the town needed a real face-lift, she decided to give it one. It was, from the outset, truly a community project, since local businesses and citizens donated the $2,600 needed to support it. "The masks were a way for me to get involved with the community in an artistic way," explains Maggie, a gregarious Tennessean who moved to Montgomery with her writer husband in 1973. "I thought a town as open as ours would be receptive to the idea that ordinary people who think they have no artistic ability can discover they do."

The history of mask making goes back a long way. There is at least one representation of a mask in a Paleolithic French cave painting that may be 15,000 years old. The Egyptians used funerary masks to help protect the faces of embalmed corpses. The Mycenaeans and the Aztecs used masks for ceremonial purposes and the Greeks made masks to act out dramas.

*Changing identities with feathers and mud*

Indigenous cultures have utilized masks, too, particularly in Africa, Melanesia, Sri Lanka, the Americas. Most often, their masks—made with wood, fur, cornhusks, feathers, cloth and mud—were a means of contacting spiritual powers. They transformed the identity of the wearers into supernatural beings, ancestors or imagined figures.

Whereas the masks of older cultures disguised people, the Montgomery masks have the opposite effect. They emphasize certain well-known aspects of their wearers and some of them reveal even more subtle dimensions. Taken all together, they represent the artistic expression of the entire community. In this regard, they constitute a vivid form of contemporary folk art that underscores the diversity and vitality of the human imagination in any community.

The actual making of Montgomery's masks took place mostly at the Grange Hall. The process was surprisingly simple. First, Maggie Sherman tied a bandanna around a person's hair, to keep it out of the plaster. Next, she greased the face with Vaseline, so the plaster would not stick. Then, small strips of plaster-soaked gauze were put on the face until it was covered. The gauze, which is the same material used in casts to immobilize broken limbs, took about five minutes to set. Finally, it was peeled off.

The typical reaction of most people, Maggie recalls, was a few moments of awed silence and then an exclamation: "Gosh—that's me?" It was, in effect, a moment of revelation because few people ever see themselves in three dimensions. Some folks were ap-

Pam Clokey (left) and Jessica Poirier pose with and without masks. When it came to decorating, artists had

a free hand—and used it. Pam's mask is doll-like self-portrait, whereas Jessica's is an exotic fantasy.

At work, bartender Gussie Zachadnyk (right) wears campy get-up complete with plumes and fancy fan. Feathered theme is carried over in her flashy mask (below). Gussie decorated it in only 30 minutes. As for the vivid tears, she recalls, "I was *angry* when I did that mask!"

Howard Sylvester (right) was born in Montgomery Center and still lives there with his wife, Shirley. He works in an asbestos plant and she's a bookkeeper. Shirley finished their masks (above) using ordinary house paint.

John C. Meyers

School bus driver Wayne Sylvester owns the only gas station in Montgomery. He went along with the mask project because others did, too. He admits he felt a little silly but now insists, "I didn't mind doing it."

palled but most took it in good fun. Irene Scott, 72, a retired schoolteacher, wrote this short song, based in part on a famous limerick by Woodrow Wilson, to express her reactions:

> I'd rather have fingers than toes
> I'd rather have eyes than a nose:
> And as for my hair, I am glad it is there.
> I'll be sorry, you bet, when it goes.
> For beauty I'll not take a prize
> There are many more handsome by far;
> My face, I don't mind it, for I am behind it,
> The fellow in front gets the jar.

Much of the decorating was done at the Grange Hall, too, using paintbrushes, tempera colors, glitter, buttons, shells, feathers, furs, seeds, flowers, fabrics. Some Montgomery natives took their masks home and went a few steps further than most, using hats, scarves, glasses and pipes to enhance their images. Others attached written notes. A few pasted on photographs, cutouts from newspapers and magazines, medallions, pipe cleaners and military ribbons.

Armand Chauvin, a bus driver, used garter straps for ears. Merrill Cabana, a farmer and selectman, pasted a cutout of a Jersey cow on his forehead. (Jersey cows are preferred by some hill farmers for, although they do not produce as much milk as some others, they supposedly can get around the hills better and their milk does have a high butterfat and protein content.) Richard Ross, a free-lance commercial artist, used paintbrushes, pens and other tools of his trade to decorate his mask. He also colored his eyes bloodshot, because he works late at night to meet deadlines.

Some people had help making their masks. Glendora Farrar, for example, did most of the work on the mask of her husband, Cortes. "He always wanted to play Santa Claus at the church but they never asked him," she says. "So, I made this mask look like Santa." Cortes adds: "I would have been a good one, too."

The youngest mask makers decorated their faces with an almost aboriginal glee, using bright primary colors, lots of buttons, fur and glitter. The older peo-

*Writer and photographer Peter Miller lives in New York City and Vermont. His book,* The Photographer's Almanac, *was published recently by Little, Brown.*

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ple, on the other hand, were inclined to make their faces more realistic. Charlotte Soule, who is 68 and lived on a hillside farm for 36 years, is partially blind but managed to color her mask anyway. Relatives then added the eyebrows, lips and curls. They also added lace and a crown so that the mask could be called "Queen of the Hill."

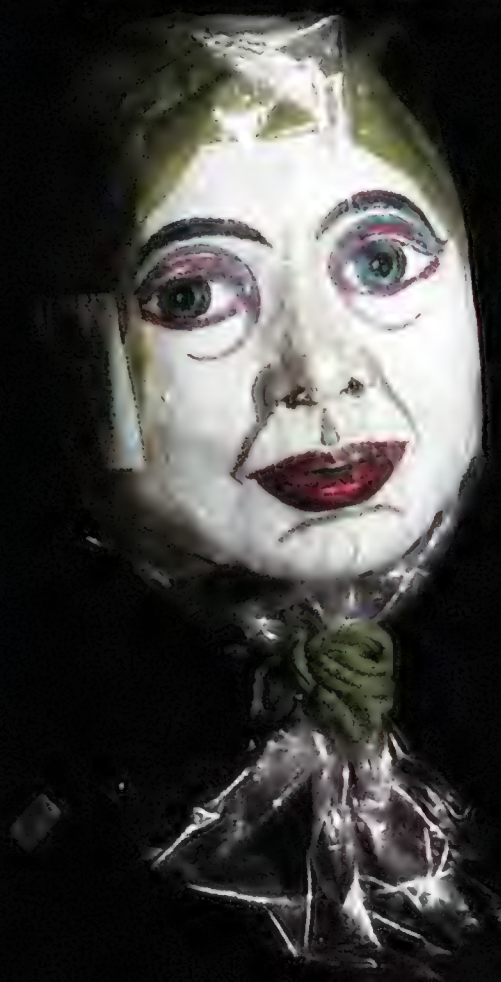
Montgomery's masks went on display—at the Grange Hall, naturally—on an August day made more festive still by the volunteer fire department, which donated a keg of beer; by a local inn, which provided a large batch of lemonade; and by a lot of other people who donated a lot of other things. Some 300 natives turned up for the occasion, admired the masks and joshed each other gently. "How come they didn't make their masks look like they *really* are?" one woman chided. But then she allowed as how, in fact, she was more than a little proud of the entire project.

**"I really like tigers. I wanted to put ears on but I didn't have the material. I wasn't really happy with the mask but others thought it was nice." Tammy Matejek, 14**

**"I painted both of the masks. I thought they should be painted looking at each other. We have a very nice marriage and I guess I just like to look at him." Beverly Poirier, 50**

**"Some of the masks were just thrown together. I wanted to show what could be done with more time. I wanted to do my entire body." Al Bowman, 37**

**"The day I brought it down here it was raining, so I put a plastic bag on it. We decided it would be fun to leave it on." Marianne Blanchard, 55**



**"I wanted to show the things I'm known for. I have long lashes that freeze shut when I go skiing and the pearl on my lips is for my buck teeth." Judy Rowland, 27**

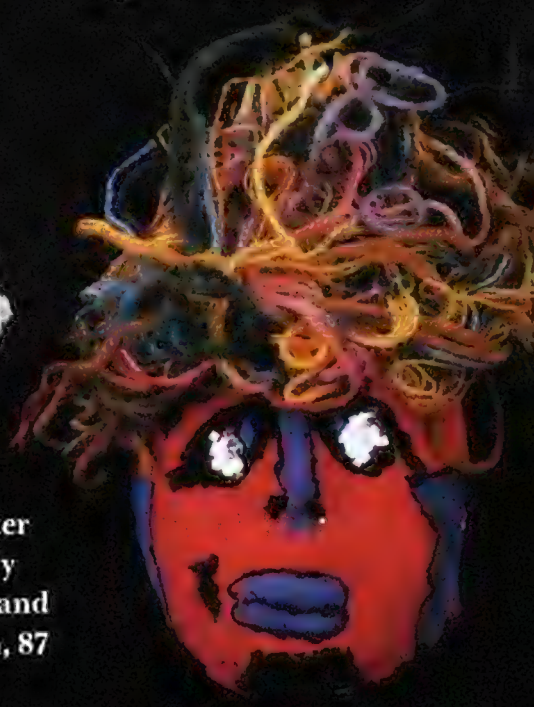
Maggie and her neighbors are reluctant to analyze the masks psychologically, but many people who see the New England Foundation's traveling exhibition may find the temptation irresistible. The exhibition breaks the masks down into different categories including couples, fantasies, farmers, local celebrities, senior women and occupation. When the show is over, the masks will be returned to Montgomery, packed in boxes and stored away.

Five of the masks have already assumed more importance, historically, than the others. They are the ones belonging to townsfolk who recently passed away, including Ethel Brooks, one of the project's biggest boosters. She painted her mask an exhilarating sky blue, put a bright ribbon in her hair, and sprinkled a sparkling border of sequins around her face. She was 76 when she died, Sherman says, "but hers was the youngest looking adult mask of all."

**"I'm used to putting make-up on so this was easy. The more I did, the more I wanted to do. It was a novel way to get a town together—look what happened!" Gini Bowman, 32**

**"I didn't want to do it but they kept after me, so I did. I thought I was too old. My daughter helped. I told her to fix it up and make it look like me." Virginia Gonyea, 87**

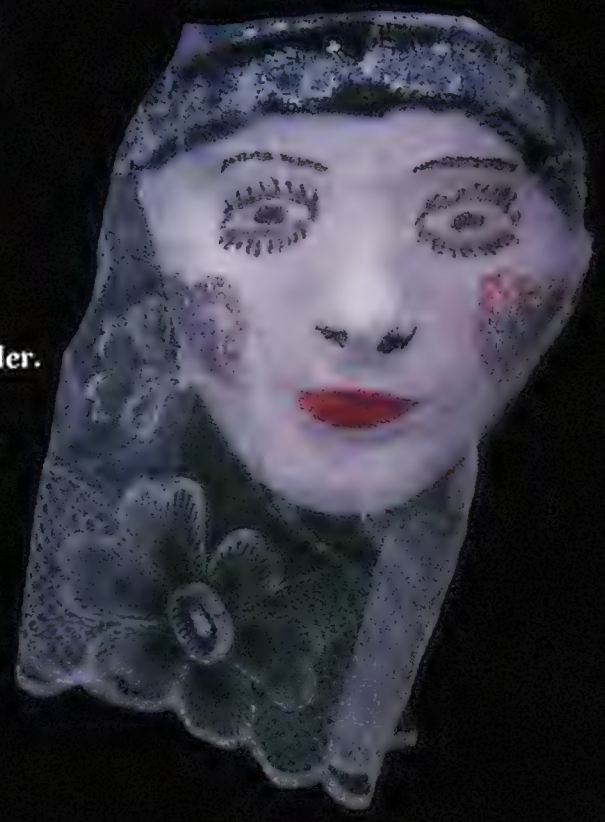
**"It's a kind of monster—no special monster, just a friendly monster. A space monster, maybe. I like the design on it." Allen Dueso, 12**



**"I didn't think of myself when I did my mask. I thought of the sun. We all love the sun. We wouldn't be here without it." Nancy Hartung, 35**

**"Everybody knows I'm a gambler. I play cards with friends. Those things on my cheeks are aces." Michael Sheltra, 22**

**"No one else had a veil and I felt like being different. Everything seemed to work out. I never did anything like it." Wendy Ryea, 16**



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Each time you use the American Express Card until the end of this year, American Express will make a contribution to The Statue of Liberty—Ellis Island Foundation. That is, each time you use the Card for shopping, travel, entertainment, dining, or for any other reason, not only will you benefit, but so too will the Statue of Liberty.

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We believe this to be an exceptionally fitting solution to a very pressing problem.

For, while it is she who stands for all of us, it seems a most auspicious moment to show that all of us truly stand behind her.

The American Express Card. For the sake of the Statue of Liberty—Don't leave home without it.®

*Contributions made through this American Express program are not tax deductible.*

*By Robert Wernick*

# Thinking big and better, too, at the University of Texas

Santa Rita No. 1, a mother lode for the university, began producing oil—and money—May 28, 1923.

Typical Texas tumult erupts at a football game, with students making "Longhorn" hand gestures.

*One of the wealthiest of them all, the school that oil built observes its centennial year by striving hard to be one of the best as well*

All of us Harvard alumni became suddenly aware a year or so ago that if we did not dig down dramatically deeper into our pockets, our alma mater was in danger of losing one of its most precious primacies: the University of Texas System was within half a billion dollars of catching up with Harvard's endowment.

In Austin they consider that a negligible margin and everyone you meet there with any interest in the subject at all will assure you that it will soon shrink to

*University of Texas thinks big*

University President Peter Flawn says time of easy grades is over. "Students have to work these days."

zero. Texas has alumni of its own. The campaign to raise money for the centennial of the University of Texas at Austin (UT), which occurs this year, has already collected enough cash backed up by matching funds to endow more than 500 faculty positions, enough to staff a platoon of lesser universities.

But Texas, unlike Harvard, does not have to rely on merely human givers. Out in the wind-scoured badlands between the Concho and the Pecos, scores, *hundreds* of little black pumps are continually rocking, bringing up oil; and the University Fund collects a royalty on every drop of it.

It was not planned that way. In Austin 100 years ago this September, the university held its first classes in a wing of the state capitol. There were eight professors and a couple of hundred students. Texas then was a land of hard-working debt-ridden farmers, and their representatives in the legislature saw little reason to pay out good money so that a handful of youngsters could quit the plow to learn French and fancy manners. They intended at first to give the university some forest lands in the east to help pay its expenses, but that meant taking valuable land off the tax rolls. Instead, the legislature decided to give the university two or so million acres of unproductive land in the west.

*"Unstinted wealth" gushes forth*

For 50 years the university scraped along. Then in 1923 it decided to dig into its subsoil. On May 28, 1923, a well named Santa Rita No. 1 blew in with 100 barrels a day. It was the first drop of a mighty flood: the Permian basin, which underlies the university lands, has proved to be one of the great oil pools of the Western world. A university wall bears a carved inscription with the strangely prophetic words of the first president of its Board of Regents: "Smite the rocks with the rod of knowledge and fountains of unstinted wealth will gush forth." The university was rich. It was not yet distinguished.

Certainly the university was outstanding as a training ground for Texas politicians. Student elections were taken very seriously in Austin; there was a dormitory nicknamed Tammany Hall; and all the traditional Texan arts of persuasion and intrigue, combining the sinister stealth of an Ottoman seraglio with the passionate caterwauling of a Punch and Judy show.

All of its millions of dollars in revenue was—and is—managed by a Board of Regents appointed by the governor and subject to no check or higher authority. They made their own rules and few of them died broke. Regents appointed by governors like Jim Ferguson or his widow, Ma, who suspected that all educa tion was a subversive activity, or by W. Lee O'Daniel, who expressed his philosophy of life in the song "Pass

Hundred-year-old photograph includes the entire faculty of eight. No one at Texas can explain the straw.

A bricklayer's strike had prevented construction of campus, so first classes were held in state capitol.

the Biscuits, Pappy," were only tangentially interested in the academic life. They had as much connection with the free exercise of the intellect, said that fine Texan writer J. Frank Dobie, as a razorback sow does with the "Ode on a Grecian Urn."

In those days it was the law that the oil-royalty money could be spent only on buildings; things like professors' salaries had to be doled out yearly by state legislators who were afraid of subsidizing Communism and short skirts. In some ways this was a lucky thing for Texas, for the money spent so lavishly in the 1930s did provide them with a remarkable campus. If they had waited till after the war they probably would have got a faceless, concrete factory complex. As it was, they got the architect Paul Cret, trained at the Beaux-Arts in Paris, a master eclectic who could mix modern construction with the decorative styles of the past. He created the Texas campus as it is known today, four quadrants with broad malls leading to a great 27-story tower in the middle with a little Greek temple on top. This is the tower that is illuminated for events of outstanding significance: when the Longhorn football team wins a game against Texas A&M, for example, or when a Texas professor wins a Nobel Prize.

Cret's campus has stood the test of time remarkably well. Even today, when the university has grown to gargantuan size (last year's enrollment was more than 45,000), his design manages to hold the traffic, to look uncrowded and relatively peaceful. Walking down the malls between the Cret brick and limestone buildings with their warm tones and Spanish-colonial look, with an ebullient mass of students milling through the shade of the live oaks, cypress and willows as they hurry to botany class or pass out leaflets denouncing Secretary of the Interior James Watt, it is easy to forget that just across the boundary streets lies the great

*A man of many trades, author Wernick wrote most recently on goats in December 1982; Roquefort cheese, February 1983; Vaux-le-Vicomte in August.*

William H. Crain, curator of Hoblitzelle Theater Arts Library, shows off movie posters of bygone days.

It's a long way down in this ceiling's-eye view of great bowl of the Frank Erwin Special Events Center.

growing city of Austin with its high-tech plants and beer joints and X-rated movie houses.

In this pleasant island the university ambled along in a pleasant provincial way, producing championship football teams and what many, including even some non-Texans, consider to be the best marching band in the United States. Even today there is more frenzy about gamesmanship than there is about scholarship. Take the annual game between the University of Texas Longhorns and the Sooners of the University of Oklahoma, when things come to a volcanic head in a kind of War Between the States, full of chauvinism, boasting, bragging and orgiastic letting off of steam. This event takes place on the second Saturday of every October in Dallas' Cotton Bowl, and it is the centerpiece of a three-day blowout that, even in the superlative state of Texas, is the loudest and rowdiest and showiest event of all the year.

But Texas, like the South in general, has been changing. Students were eager to break out of the regional straitjacket and share in the flow of ideas crossing the world. In 1958, the university's 75th year, a distinguished Committee of 75 took a hard look at the institution and found it wanting in almost every respect. It had a "disproportionately small number of eminent scholars, a dangerously small number of young promising men." It was deficient in research capacities. What to do about it? There was a long list of recommendations, which could be boiled down to one injunction: Let us buy our way to greatness.

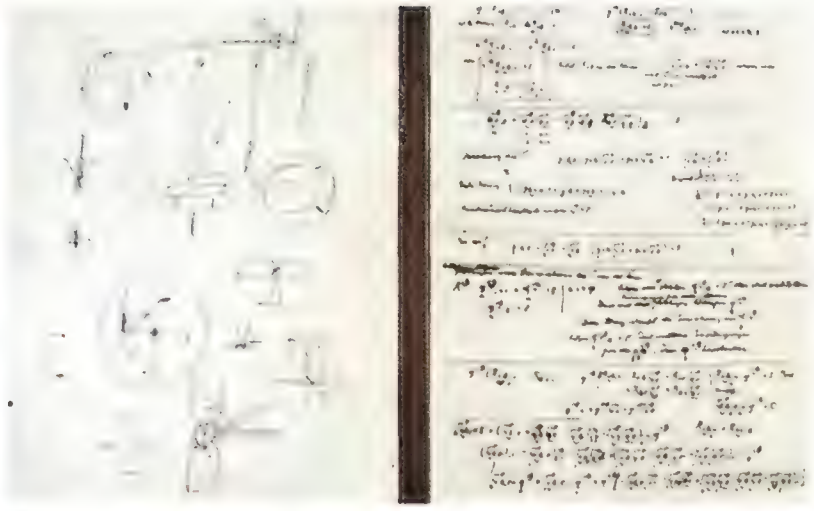
The word was soon out in academe: Texas was in the market for brains. A substantial part of the flood of money that had hitherto gone only into bricks and mortar was now diverted to building research facilities and institutes, increasing salaries and hiring teachers.

A first important step was taken by Logan Wilson, who was president of the university at the time of the report of the Committee of 75. He began to have the place air-conditioned. Scholars had understandably been reluctant to work in libraries where the temperature could hover around 110 degrees F for weeks at a time. With this simple stroke a six-month school was turned into a year-round one.

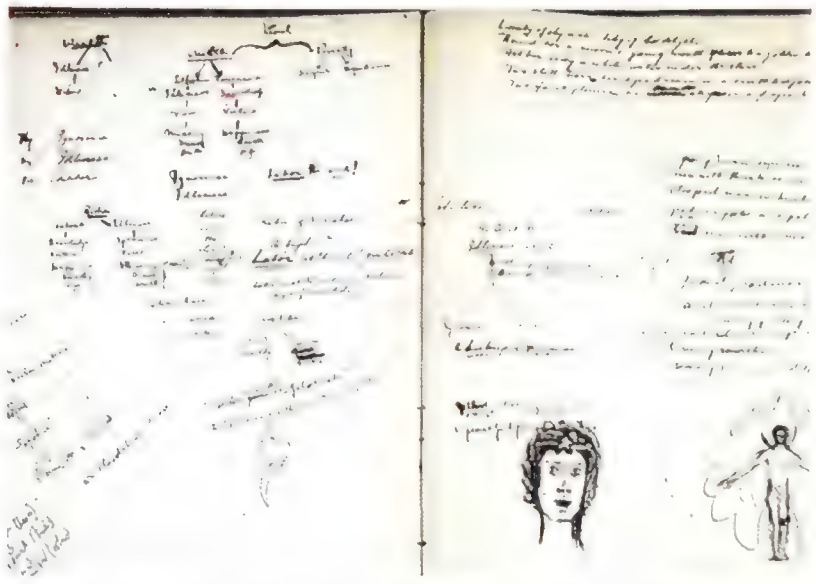
The succeeding president, Harry Ransom, saw himself as a man with the mission of turning UT "from an outpost to a crossroads." He wanted a highly visual symbol of the new interest in things intellectual and found it in his own passion for collecting. Perhaps no public collector in history had ever had so much money to devote to his hobby, and Ransom seized the opportunity with joy.

He began with books. Texas already had a reasonably good research library. There was no use trying to rival the major libraries of the world in their collections of first editions and incunabula—most of the prize items had already been run to ground. Texas could, and did, buy a Gutenberg Bible for $2.4 million,

Seating is adjustable to accommodate 3,000 to 18,000 for basketball, banquets, rock concerts or circuses.



The mammoth collection of 9,000,000 manuscripts includes this prize specimen of Einstein's work.



Doodled page is from papers of poet e e cummings. An entire range of modern literature is represented.

but under Ransom's guidance it created a whole new kind of collection. In addition to printed editions, what he wanted was the preparatory work: the first jotted scraps in the author's notebook, the revised ink-spattered manuscripts, the correspondence with publishers and agents, the galley proofs, the page proofs. Such material could be picked up almost for the asking in those days; soon, at Ransom's asking, it was arriving in prodigious quantities. The wagon trains, said waspish critic John Hayward in London, are heading west with the contents of England's wastebaskets.

On they came and they are still coming; the Humanities Research Center contains nine million literary manuscripts representing the whole range of modern writers in English and French, from W. H. Auden to Louis Zukofsky, along with 800,000 printed books and 50,000 pieces of literary iconography—photographs, paintings, busts and such. Here are the three totally different versions of *Lady Chatterley's Lover*, the corrected page proofs of *Ulysses*; a self-portrait by Dylan Thomas; angry scribbles by George Bernard Shaw beside proposed illustrations to *Pygmalion*—"Eliza Doolittle is *not* a hoyden"; the complete library of Evelyn Waugh moved from England with its original shelves; Gertrude Stein's address book opened to P for Picasso; the reconstituted study of Erle Stanley Gardner, complete with a recording of the master describing his work habits and his philosophy of life; the grade-school report cards of e e cummings; records of the travails and triumphs of Charlotte Brontë and Fanny Hurst, Alfred Tennyson and Tennessee Williams and anyone else you care to name. Scholars have duly swarmed around all these materials, and the center estimates that 100 books plus innumerable doctoral dissertations are produced each year based on the Ransom archives as a major source.

From books, Ransom branched out to other forms of communication: theater, movies, music, photography. Here again the treasures and curiosities crowd the walls, the file cabinets, the shelves, the packing boxes. There are five million photographs, going all the way back to the first one ever made—in 1826 by Nicéphore Niepce in Chalon-sur-Saône.

Drop in on the theater-arts collection and you will find playbills, posters, stage designs, stills from movies, painted scenery from plays and movies of the past century. There is sheet music going back to the Christie Minstrels in the 1840s. You can admire the wasp waist

*University of Texas thinks big*

Harlan Smith, director of the McDonald Observatory, peers over a model of the world's largest telescope.

on the dressmaker's dummy used for Vivien Leigh's gowns in *Gone With the Wind*, a frail appendage to the mounds of boxes containing 46,000 pounds of paper which trace every inch of the career of the film's producer, David O. Selznick.

An even weightier mass of papers is to be found at the Lyndon Baines Johnson Library and Museum, built by the university on its campus. It took a dozen 40-foot vans to move them here from Washington, and each year 200 new scholars come to sift through them, collectively uncovering all of Johnson's manifold sides. Its fancy audiovisual devices, slide shows, animated displays, old movies, and recordings of LBJ drawling out his long spicy Texas jokes have made this library the biggest tourist attraction in Texas after the Alamo.

And there are other collections as well. The Benson Latin American Collection contains 450,000 books and two million pages of manuscript, everything from some of the first census reports to the Council of the Indies in the 1500s to the latest reports on matters economic, social or cultural. The Archer M. Huntington Art Gallery holds an impressive collection of the art of the American West. There is also a collection of modern American art, presented by Mr. and Mrs. James Michener because they liked the spirit of both old and new Texas here at the university; it is a marvelously pedagogic collection since it contains one or two absolutely typical works by just about every well-known name on the contemporary American scene.

*A mighty gray-cell migration*

All these riches are impressive enough. But in the long run, what really makes the greatness of a university is the quality of its teaching staff. Texas soon realized that the path to success was not only to offer higher salaries than anyone else but to provide the kind of surroundings where distinguished scholars would be happy to work. The pattern was set in 1967, when Ilya Prigogine was lured to divide his time between Brussels and Austin by a promise to create a Center for Studies in Statistical Mechanics and Thermodynamics to his specifications. The center is world-famous now, and was named for Prigogine after he won the Nobel Prize in chemistry in 1977.

The university found a true pilot fish to lead the gray-cell migration to Austin in John Wheeler, the eminent physicist, collaborator of Niels Bohr, pioneer in nuclear fission, restless researcher in the far reaches of relativity theory—the man who gave the name "black holes" to those collapsed mighty stars. Wheeler was at a scientific conference in Brussels in 1975 when someone suggested that he move to Texas. At first the idea sounded preposterous; why should he give up a lovely home in Princeton, the scene of his greatest pro-

# WINE & FOOD

# Taste of the Holidays

During the holidays, the kitchen is the heart of our Sonoma Valley home. Here, the marriage of wine and food fills the air with wonderful aromas and memories of vintages past.

## WINE

It's a time for California sparkling wine, and we express this festive tradition with Sebastiani Brut Three-Star, a premium sparkling wine made entirely from Pinot Noir grapes grown in Sonoma County. Though it requires extra-time and special care, we produce Brut Three-Star by the classic *methode Champenoise*, a method that dates back to seventeenth century France. In each individual bottle, bubbles were formed naturally during a secondary fermentation, and fifteen months of aging on the yeast has developed




a depth and complexity that make Brut Three-Star a sparkling wine of extra-special character.

## FOOD

Once reserved for special occasions only, sparkling wine is now enjoyed in combination with many fine foods.

We enjoy Brut Three-Star with different hors d'oeuvres and also with various [illegible]fish, particularly fresh dunge[illegible]crab. In a classic match betwe[illegible]parkling wine and food, my wi[illegible]icki has created a *Caviar Pasta* [illegible]hat marries the rich flavors of ca[illegible]egg, cheese and onion with [illegible]risp, toasty flavors of Brut Thr[illegible]ar.

If you w[illegible]ike to sample some of our fam[illegible]oliday recipes and learn mor[illegible]wine, please write to the add[illegible]low for your free brochure [illegible]ine and Food: Taste of the Holidays."

From my family to your family . . . Buon Natale!

Sam J. Sebastiani

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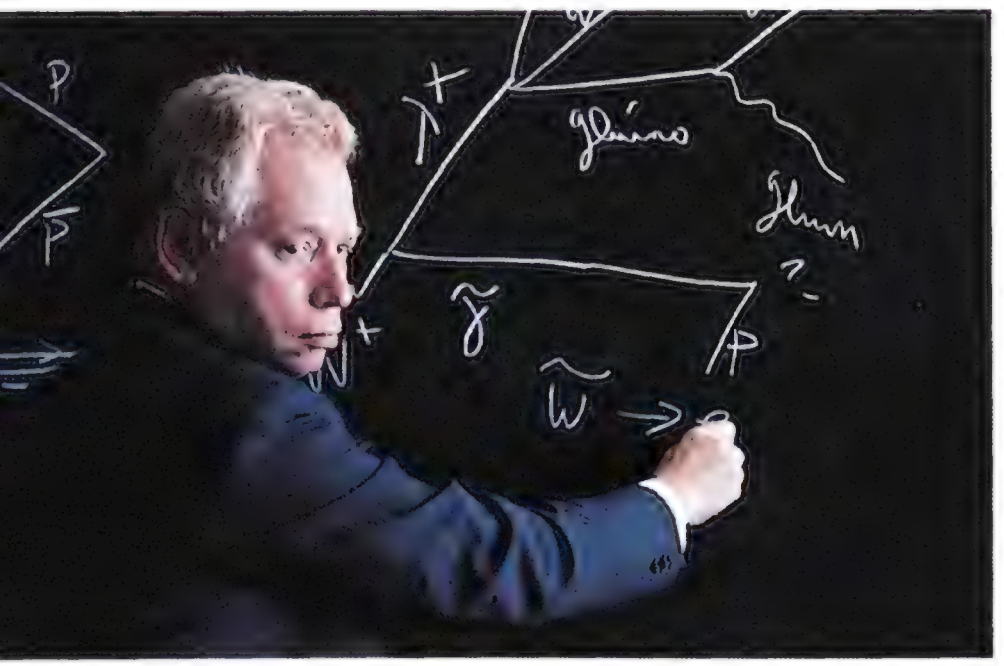
*Sebastiani Vineyards, Dept. H, P.O. Box AA, Sonoma, CA 95476*

Author James Michener, at work on his book about Texas, gave university a collection of American art.



Physicist Steven Weinberg won the Nobel Prize in 1979; he is the predictor of W and Z particles.

Walt Whitman Rostow, special assistant to Presidents Kennedy and Johnson, teaches political economy.

fessional triumphs, to go off to Austin, which was about as far as you could get in the continental United States from any traditional center of learning? But gradually the idea began to seem attractive after all. Unlike Princeton University, UT would let him go on teaching indefinitely after his official retirement age. It would give him all the research equipment he asked for. Then he came West and caught the disease they call Austinitis, which means you love the place to distraction. He now describes the university in unashamedly boosterish tones as "a can-do university in a can-do city in a can-do state."

Examples of what Texas can do turn up regularly. Last fall a group of electronics companies announced plans for a microelectronics and computer-technology research center which would have an annual budget of up to $100 million. Fifty-seven cities in 27 states put in bids to be the headquarters. The winner was Austin because it offered, among other things, low-cost laboratory space at the university.

*A fertile place for science*

A few years ago the federal government was looking for a location for a national center for fusion theory. There were many candidates, but UT was the only one that offered to put up a matching grant of $5 million, and it got the contract. Marshall Rosenbluth, the greatest name in plasma physics, was glad to come from Princeton to take charge of an Institute for Fusion Studies. Also on the campus is the Fusion Research Center, where theoreticians and engineers, professors and graduate students, are working with TEXT, the Texas Experimental Tokamak (tokamak is Russian for torus, which is geometrese for doughnut) in which plasma can be created—the "fourth state of matter," neither gas nor solid nor liquid. Here hydrogen nuclei can fuse to form helium, releasing an enormous amount of energy. When the process is perfected (before the year 2020, they say confidently) the world's energy problems will be solved.

Even more exciting things will come out of the Tokamak. Work there will enable scientists to make measurements of the behavior and properties of plasma infinitely more precise than they can make today. Steven Weinberg, Nobel Laureate late of Harvard, who predicted the existence of the W and Z particles, is leading a bright young team in search of the unified theory that will explain all of the underlying forces operating in nature and achieve that elusive goal of physics: to "actually describe the real world."

To help peep into the heavens, researchers will have in a few years the services of the most powerful telescope in the world which the university plans to build near its McDonald Observatory, already one of the

# WHILE SOME CARS MIGHT MAKE IT TO THE NEXT DECADE, STATISTICS SHOW VOLVOS COULD MAKE IT TO THE NEXT CENTURY.

Today people are trying to hold on to their cars longer than ever.

And while statistics show the average life expectancy of today's cars is eleven years, that figure pales in comparison to the life expectancy of today's Volvo.

Because statistics show the average life expectancy of a Volvo is over sixteen years.*

Which could mean over sixteen years of comfortable driving in seats equipped with adjustable lumbar supports that relieve tension and road fatigue.

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If all this sounds like a sensible way to transport yourself to the next century, buy a Volvo.

Who knows?

By the year 2000 we may have a car that'll get you through that century, as well.

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A car you can believe in.

*Based upon an actuarial analysis of 1981-1982 U.S. Registration Data conducted by Ken Warwick & Associates, Inc. Due to many factors including maintenance, driving conditions and habits, your Volvo may not last as long. Then again, it may last longer. Summary available at your Volvo dealer. © 1983 Volvo of America Corporation.

Hundreds of scholars annually work at resplendent Lyndon Baines Johnson Library, also a tourist stop.

Tower on the campus is custom-lit for notable events, whether a Longhorn victory, here, or Nobel Prize.

busiest anywhere. The new 300-inch telescope will not only be bigger than the previous record holder—the 236-inch one the Russians built in the Caucasus, which has had a disappointing performance because of defects of design and bad atmospheric conditions—but it will be much more compact, easier to maneuver and to maintain, and much cheaper. When it is completed in the late '80s, costs are not expected to have gone above $50 million, which is less than one-tenth the price of the Russian telescope.

Spectacular developments are occurring at the Clayton Foundation Biochemical Institute, where they have identified more vitamins than any other research group anywhere. There is a steady effort to upgrade all the departments of the university, sciences and humanities alike. Some, like botany, linguistics and Spanish, are ranked among the top in the country. So is the law school. So is the new Lyndon B. Johnson School of Public Affairs, where a faculty including three former cabinet members and former Congresswoman Barbara Jordan is engaged in training politicians of the future.

Despite all of the money spent on attracting eminent professors, building laboratories, tokamaks and telescopes, there has been enough left over to keep putting up buildings on a truly Texan scale. Frank Erwin, an Austin lawyer, was chairman of the Board of Regents and guiding genius of the university during many turbulent years of the 1960s and '70s. He was a favorite target of the campus radicals—"He personifies the devil in the life of the mind," said one of them, and he reciprocated by calling them a "bunch of dirty nothin's." Like his friend Lyndon Johnson, he had a taste for the grandiose and a remarkable skill for wheedling money out of legislators. He was also the moving force behind the construction of the university's imposing Performing Arts Center, its colossal swim center and its supercolossal Frank Erwin Special Events Center, which can seat from 3,000 to 18,000 people depending on the nature of the event, be it banquet, basketball game, rock concert, circus or, as it turned out, Frank Erwin's funeral.

*The prospects are rosy*

As all these mighty walls echo to the fanfare of the centennial celebration, where does UT stand? To its more buoyant graduates, the battle is already won. Texas is already so top-heavy with talent that it cannot fail to assume first place in the world: Austin will be to the 21st century what Paris was to the 13th, what Oxford and Cambridge were to the 19th.

The people who run the place are more modest and more realistic. They know that even in Texas fruit does not ripen overnight. They know that in its first

hundred years the university has had only three students whose names would be recognized instantly in Valparaiso or Vladivostok or anywhere: Walter Cronkite, Lady Bird Johnson, Farrah Fawcett. But, they ask justifiably, could Harvard have boasted of that many in 1736? They know that growth is necessarily unequal when you are trying to develop in a dozen directions at once.

Peter Flawn, a tight-lipped geologist who is the incumbent president, says that one major obstacle to progress is the legion of "state and federal regulators and accountants" who threaten to bury even these massive walls under a deluge of paper. In the long run, says William Livingston, vice president, a university's rank depends on a consensus of the judgment of its peers. "In today's academic world we are considered in the second echelon of state universities. If by the end of this decade we are counted in the first, along with Michigan and California and Wisconsin, then I think we will have succeeded."

A prudent administration is looking into the future far beyond that date. It knows that the oil supply in the Permian basin is a finite resource that will one day need to be supplemented or supplanted. It has invested four million dollars in growing grapes around the town of Bakersfield in Pecos County, which has soil not unlike that of France's Bordeaux region or of Napa Valley in California. By the time the oil starts to diminish, a flood of fine and expensive cabernets should be pouring into the cellars of the great restaurants of the world. Let Harvard eat its heart out: no wine grapes grow by the River Charles.

University of Texas marching band, as legendary as the Longhorn football team, has a repertoire which includes *The Yellow Rose of Texas, Texas Fight,* and, yes, of course, *The Eyes of Texas.* Surprise!

*Simulated TV picture.*

# Why Diamond Vision Is Scaring The Daylights Out Of The Television Industry.

People buying televisions aren't the only ones looking intently at Mitsubishis these days.

So are the people making televisions. What they're seeing is what their would-be customers are seeing: a television picture that is significantly more vivid, more detailed, more dimensional than their own.

What's more, these manufacturers are well aware that to keep pace they must develop the technology that does what only Diamond Vision™ does.

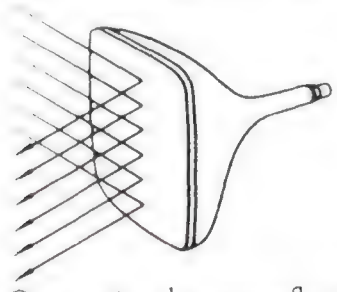
DIAMOND VISION

## UP TO 40% WIDER COLOR RANGE WITH DIAMOND VISION.

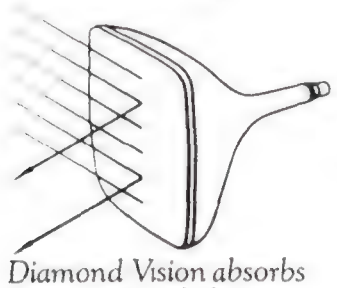
Daylight or roomlight that's reflected into your screen destroys the color and robs the

contrast from a television picture—anyone's television picture.

A combination of chemicals mixed into a Diamond Vision screen absorbs most of the ambient light striking the faceplate. While at the same time, the screen selectively filters out the impure light emitted by the phosphors. And the phosphors themselves have been "re-engineered" to match the screen's new transmission characteristics.



*Conventional screen reflects most ambient light.*



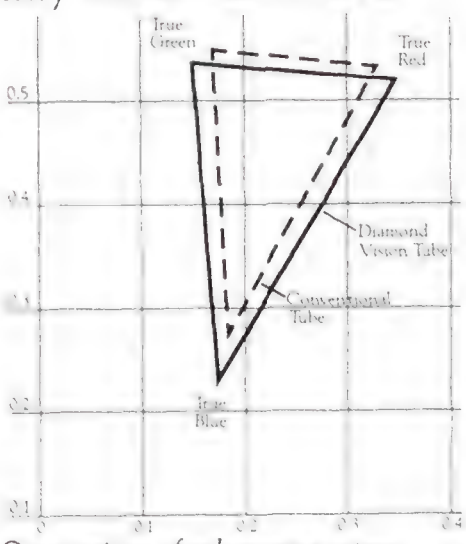
*Diamond Vision absorbs most ambient light.*

This process has a number of desirable effects on the quality of the image reaching you in your living room.

The colors are deeper, purer, astonishingly rich with dramatically improved contrast, all relatively unaffected by the amount of ambient light present while you're viewing.

And, since the color is more accurately reproduced, subtle shades and hues are revealed. Sky blue, sea green, crimson rose. Colors not seen on any other set. With a three-dimensional quality that makes others look flat, homogenized in comparison.

Frankly, it would be overly conservative to call Diamond Vision anything less than one of the two most important innovations ever in the color television tube.




*Comparison of color range reproduced by Diamond Vision and conventional TV tube under ambient light.*

This year, Diamond Vision is featured on a full range of Mitsubishi color TV's, from our 13-inch portables to our 25-inch consoles. Most of these models, typified by the distinctive CS-1960R Monitor/Receiver, shown here, also include a host of technological refinements and creature comforts making them as beautiful to live with as they are to watch.

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*We originally developed Diamond Vision for outdoor stadiums.*

You can verify all this with a visit to your Mitsubishi dealer.

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Originally developed by building 40-by-60 foot television for sports stadiums. Now drastically reduced for the home.

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*Mitsubishi Electric Sales America, Inc., 3030 E. Victoria St., Rancho Dominguez, CA 90221.*

*By Richard J. Margolis*

# For the volunteers, dousing flames is only part of the job

*In the nation's small towns and villages, the volunteer fire department provides protection, as well as some fun and games*

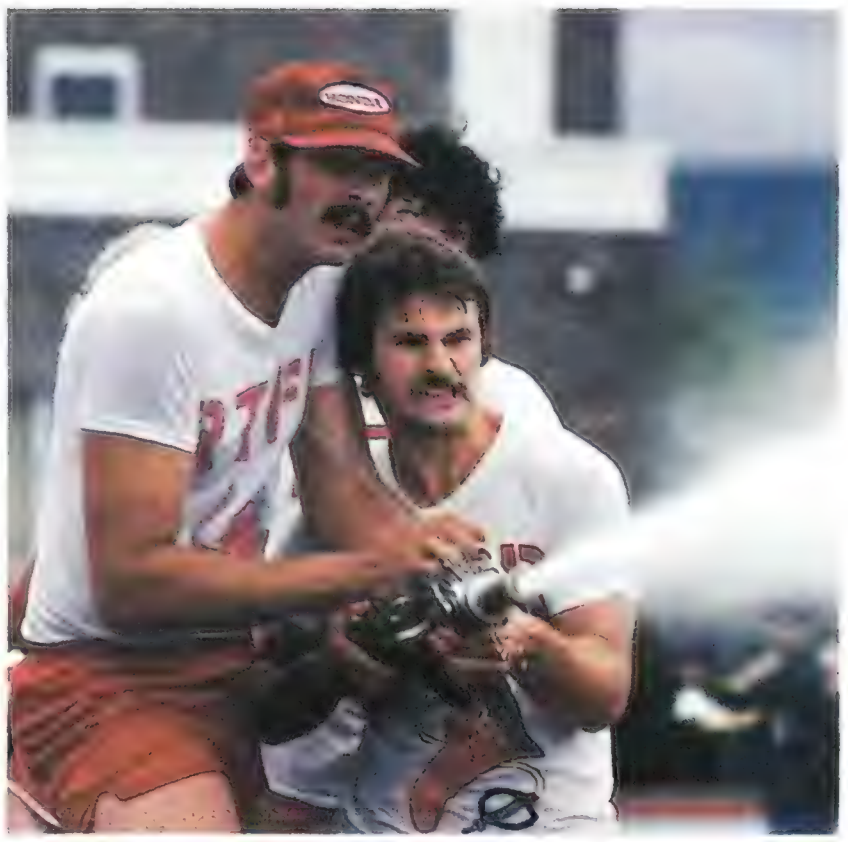
It had been an unusually dry autumn. Swiftly and scarily my little trash-can fire strayed beyond bounds, climbed a shagbark hickory and began crackling from treetop to treetop. I ran back to the house and telephoned the village fire department. Even before I'd hung up I could hear the fire horn's reassuring wail a mile away, and soon two red pumpers came careening down our dirt road, sirens blaring, bells clanging. Some of the fire fighters were my neighbors, yet in their brimmed helmets and yellow slickers they looked strangely unfamiliar—more consequential.

Quickly they doused the fire, and almost as quickly they collected their gear, negotiated our driveway and rumbled out of sight. But not out of mind. For in those brief moments of flare-up and extinguishment I had gained a new affection for that most taken-for-granted of social inventions, the volunteer fire department. Some 28,000 of these safeguard our towns and villages. They are sustained by about 1.5 million volunteers.

If the volunteer fire company is today a rural fixture, it began as an urban contrivance—first in Boston, in 1717, and 19 years later in Philadelphia, where Benjamin Franklin organized the Union Fire Company (20 volunteers and 40 buckets). An idea whose time had come, it gradually spread to the provinces. By 1845 Henry David Thoreau could describe the motives of village volunteers with his usual mixture of amazement and cynicism. "If I should only give a few pulls on the parish bellrope, as for a fire," he remarked, ". . . there is hardly a man on his farm in the outskirts of Concord . . . nor a boy, nor a woman . . . but would forsake all and follow that sound, not mainly to save property from the flames, but . . . much more to see it burn, since burn it must, and we, be it known, did not set it on fire—or to see it put out, and have a hand in it, if that is done as handsomely. . . ."

The Rainbow Fire Company in Reading, Pennsylvania, "is probably the oldest volunteer unit in continuous service," according to the late Ernest Earnest, author of *The Volunteer Fire Company*. With a population approaching 80,000 and 150 active volunteers, Reading may be one of the largest towns still served by an all-volunteer fire force. A close rival is Bloomington, Minnesota, a once sleepy village south of Minneapolis, with 125 volunteers.

At the other end of the scale there is Gray, Iowa, surely among the smallest of communities that support a fire company. Twenty volunteers there protect 108 town residents as well as a scattering of farm families. According to Larry Kendle, a local gas-station owner and member of the ladder crew, Gray's fire department was reorganized in 1973 "after the old fire department went to heck."



At firemen's muster in Bennington, Vermont, race to get hose into play tests skills of local volunteers.

The citizens' intentions were mixed. For one thing, they craved safety. In those dangerous times, says Kendle, "if someone asked what kind of fire protection the town had, I'd have to answer, 'It rains here sometimes.' " For another, they yearned for a likely charity that would justify the Main Street carnival they had planned for the Fourth of July, something that might take the curse off the gambling and beer drinking that were bound to occur that day in front of the Wagon Wheel café. A new fire department in urgent need of funds seemed just the ticket.

Recently I made a pilgrimage to a score of small fire companies around the country. The journey was an eye-opener in several respects. Among other things I learned an answer—perhaps not *the* answer—to that ancient riddle: Why does a fireman wear red suspenders? It's because they're quicker to put on than a belt.

I also discovered some fresh riddles to ponder. For instance: What about contradictions that shape a volunteer's days and nights? The yawning drudgery relieved by occasional glory; the blend of superstition and science that constitutes fire-fighting wisdom (a new engine is pushed into the firehouse three times—for good luck); the deadly seriousness of the tasks that firemen perform versus the lively foolishness of the games they play—the parades, the carnivals, the water fights, all the extravagant horseplay.

Volunteers battle flames in a suburb of Rochester, New York, but too late to save this abandoned house.

*Volunteer fire departments*

Carried aloft in a "snorkel," two upstate New York volunteers aim torrent of water at a hard-to-reach fire.

And why is it that volunteer fire departments, though frequently hailed as model democratic institutions, can be as clubby as country clubs? Such riddles were among my firehouse souvenirs.

I went first to Morrisville, Vermont (population 2,074), a pretty town some 40 miles south of the Canadian border. I'd been told that citizens there had suffered much regional ridicule 15 years ago when, on a sunny St. Patrick's Day, their firehouse had burned to the ground. The Morrisville volunteers that day suffered more than embarrassment. A witness recalls that "tears rolled down their faces" as they stood helplessly by.

Before the year was out, however, the town had raised $150,000 for new equipment and construction of a new firehouse of wooden frame and brick veneer, complete with a "social room" for volunteers. The room has since become a favorite fireman's haunt, where the recreation is distinctly old-fashioned and masculine. Almost any evening one can find volunteers there shooting pool, playing poker or just chatting over beers. The talk is loud, good-natured and faintly scatological. Women are found nowhere near the premises. "I guess you could say we're a fraternity," says Lee Sturtevant, a former assistant fire chief.

When the Rev. James Missroon, pastor of the First Congregational Church of Morrisville, became a volunteer, the men kept apologizing to him for swearing. To put the men at ease, *he* said a swear word or two. "They were a little startled at first," he says, "but at least they stopped saying 'Sorry, Reverend.' "

*Dashboard like an airliner cockpit*

On the evening I visited the station, two volunteers were polishing an already gleaming pumper, a lime-green Maxim. ("Red is out now," one of the men told me. "You can't see red at night.") As is always the case with fire trucks, the driver's door had been left wide open for a quick getaway, so I climbed inside and pretended to be a fireman. It was an unsettling experience. The dashboard reminded me of the complicated panels one glimpses in airliner cockpits: it bristled with all manner of mysterious dials and gauges. And when I looked through the windshield, the truck's shiny snout seemed to stretch for miles.

"Can you actually drive this?" I asked a fireman.

He seemed amused. "Only if I'm here first," he said. "First man to answer the call gets to drive the pumper."

Later that night I watched a training session for new volunteers, one of many a recruit must endure during his six-month probation period. Using a dozen empty barrels, the firemen in charge had constructed a snaking tunnel through which the recruits were ordered to crawl. While the young men were negotiating this ob-

# SELECTAVISION

SelectaVision Video Monitor (model VJM 2023)

**INTRODUCING A HIGH-PERFORMANCE TV THAT'LL TAKE ALL YOU CAN GIVE IT.**

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RCA

# VIDEO MONITOR

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The SelectaVision Video Monitor works wonders as a high-performance television receiver, with our most advanced color picture and 127-channel tuning including cable. (The model shown actually fits 25" of picture, measured diagonally, in the same width as a 19" set.) Yet as a home video nerve center, it also does things conventional TVs can't.

15 rear input/output jacks allow you to bypass the set's antenna circuitry and plug RCA and other video and audio components—like the system shown—directly into the chassis. That means a sharper picture from video tapes and videodiscs. That also means clean, dependable hookup with jacks instead of nerve-jangling wiring. And you can run the whole show with our 58-function Digital Command Center—switching instantly from broadcast to VCR or videodisc viewing.

You can even hear better sound, because audio jacks permit direct hookup to your own stereo system. That's flexibility no ordinary TV can even approach. For a demonstration of RCA's SelectaVision Video Monitor, see your RCA dealer. You'll see it's more than just a high-performance TV. For more information and a free copy of the "Living with Video" book ( $2.50 retail value), write: RCA Consumer Electronics, Dept. 32-312M, P.O. Box 1976, Indianapolis, Indiana 46206.

WE'LL OPEN YOUR EYES.

RCA

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Beer barrel suspended from wire is the target for firemen's hoses in traditional Iowa State Fair contest.

Aim of each side is to force the barrel the greatest distance along the wire toward the opposite team.

stacle course, their veteran colleagues did all they could to rattle them, shouting and beating mightily on the sides of the barrels.

"It's nerve training," Sturtevant explained. "It teaches you not to panic in a confused situation." A week earlier, he said, the new volunteers had been introduced to smoke practice: "We got a barrel of hay and made a lot of smoke. The guys learned how to use their Air Pacs."

The serious training and the constant socializing more than suffice as an initiation into the club, and the message conveyed is that fire fighting is both a privilege and a way of life. "You have to be voted on to get in," Sturtevant says with a touch of awe.

In most respects I found the Morrisville fire company typical of other volunteer fire departments thoughout the country. Wherever I went it was clear that the presence of a firehouse in one's village was a blessing not to be scorned. Besides assuring residents a measure of protection, it attested to their organizing talents and to their resolve as a community to challenge disaster. Thus in poorer rural communities a volunteer fire company can be a metaphor for group achievement, a mark of municipal upward mobility. "We weren't nothing till we got the water and the pumper," says Johnny Jackson (p. 161), the mayor of White Hall, Alabama, a predominantly black town 17 miles east of Selma. "Before, when somebody's house

caught fire, all we could do was stand around and watch. By the time the trucks from Selma got here, if they ever did, there was nothing left. My mother lost her house that way in '79. So did a lot of others—Willie Saunders, Myrtle Watson, Adam Robertson."

On County Road 40 I stopped at the site where Myrtle Watson's house once stood. All that remains now is a square black scab fronted by three cinder-block steps leading nowhere. I could guess the room scheme from the charred detritus lying around: a blackened sink in one corner, a twisted bedspring in another. Myrtle Watson was taking an afternoon nap when she awoke to sniff the suddenly menacing air. Something of that moment's panic and helplessness still lingers here among the weeds and buttercups, an ashy odor of terror.

"Things are better now," Mayor Jackson tells me. "One day last week we saved a house." His blue-and-white T-shirt bears an inscription that bespeaks the town's sense of rejuvenation: "White Hall has it all!"

*Too old equipment, too much territory*

Even so, it remains true that rural Americans often get the short end of the hose, which is to say they suffer grievously and disproportionately from the ravages of fire. Antique equipment and expansive geography are among the handicaps that enlarge rural perils.

While inadequacies can be found in all regions, they loom largest in the South, where much of the fire-fighting machinery must be begged or bartered, and smallest in the North, where volunteer traditions are strong and distances between towns are less daunting. Thompson, Connecticut, exceptional even in the North, enjoys the luxury of five independent fire departments that serve approximately 8,300 residents. Each is fully manned (there are 200 active volunteers) and generously equipped with late-model pumpers, two-way radios, Air Pacs and a variety of other up-to-date paraphernalia.

Rural Southerners are less fortunate. As often as not the vehicles vouchsafed to their fire departments are castoffs from larger, more affluent communities. White Hall's first pumper, a Seagrave manufactured in the late 1940s, was donated in 1980 by the Selma fire department. The front "seat" consisted of three wooden boards flung across the width of the cab, with part of a tree stump plopped down for the driver to sit on.

In Trenton, New Jersey, one dealer arranged to sell an older fire truck to volunteers from a village in North Carolina. Right on schedule the Carolinians arrived in an engine even more ancient than the one they intended to buy. It was filled to the top with watermelons, which they offered in lieu of cash. "That's not the kind of green we had in mind," the

Townspeople in Gray, Iowa, play bingo at twilight during annual benefit for volunteer fire department.

A volunteer does some engine work on Gray's 1966 pumper. The department has one other, older truck.

Gray's current 20-man department was reorganized in 1973 "after the old fire department went to heck."

White Hall, Alabama, Mayor Jackson (seated) and other volunteers got truck from District of Columbia.

visitors were told. So they drove on to New York City where they sold their melons wholesale, and with the proceeds purchased the Trenton truck.

Because equipping and maintaining a fire department costs a good deal of money—the price of a new pumper these days can be in six figures—village firemen spend much of their time chasing dollars. Town taxes and bond issues pay the freight in some communities, but where money is scarce the volunteers must be imaginative. Carnivals, auctions, chicken-and-dumpling dinners and firemen's balls are still popular. So are bingo nights in the firehouse. "If it weren't for bingo," a Vermont volunteer told me, "half the towns around here would be in cinders."

The Gray Fire Belles, a ladies' auxiliary to be reckoned with, have produced a 250-page recipe book and to date have sold 1,850 copies at $5 apiece. Their husbands, meanwhile, have raised money by competing with neighboring fire companies in creative water fights. An empty beer keg is strung overhead on a 150-foot cable. Facing each other with their hoses, each team aims streams of water at the keg, attempting to push it to the far end of the cable. "You don't make much money," says Fire Chief Jonnie Meislahn, "but you can get pretty wet."

Still and all, many a village fire department runs out of cash before completing its shopping list. A decade ago help seemed near at hand when Congress began to show an interest in putting out rural fires. A measure passed in 1972 included a Rural Community Fire Protection Program aimed at providing "financial, technical and related assistance . . . to organize, train and equip local firefighting forces. . . ." Rural communities quickly queued up for assistance, only to find that the line was long and funds were short. In the Northeast, for instance, nearly 10,000 small-town fire companies applied for a total of $47 million between 1975 and 1978. Available grants during the same period amounted to only $4.2 million, and that pittance has been reduced, with sharp cuts likely in 1984.

The many hardships faced by rural fire fighters can have irreversible consequences. Last year the National Bureau of Standards conducted a 12-state study on fire fatalities and concluded that rural victims of home fires were nearly twice as likely to die as were nonrural victims. The statistics mask much tragedy, some of which I heard about during my travels.

In Audubon, Iowa, Fire Chief Cliff Petersen, the proprietor of Cliff's Lounge, answered a call to a trailer fire downtown. "The smoke was something awful," he remembers. Donning an Air Pac, Petersen broke a

*Richard Margolis is a free-lance writer concerned with rural affairs. His article on small-town post offices appeared in the July 1983* Smithsonian.

Gleaming red engine is reflected in polished silver air-chamber dome of a vintage Ahrens-Fox pumper.

rear window and climbed inside the trailer. There he found a six-year-old girl, the owner's niece, curled up in her bed. She was pronounced dead from smoke inhalation. "Kids and hogs are the same way," Petersen says. "If they can't get out, they go back to their original place and wait to die or be rescued."

In Hyde Park, Vermont, two young volunteers from nearby Morrisville were answering their first fire call. Forcing open the door to a burning apartment, they stepped on the body of someone they'd known: Percy Knight, an elderly retired grocer. Later, the shaken young firemen requested counseling from their fellow volunteer, Mr. Missroon. "The main thing they kept asking," recalls Missroon, "was 'Why?' The man was so close to the door. He was almost saved."

All things considered, firemen are probably no braver than the rest of us, but they may be shrewder in their treatment of mortality. The veteran volunteers I interviewed took care not to brood about the dangers they routinely had to face, and thus achieved a measure of grace under pressure. To paraphrase Shakespeare, they never tasted of death but once—or perhaps but twice, if one takes into account fires like the one that broke out two summers ago at a dockside fertilizer plant in Lewes, Delaware.

One of the first volunteers to arrive at the scene was E. James Monihan, a hospital administrator who happened also to be chairman of the National Volunteer Fire Council, Inc. "We'd taken a call that Saturday afternoon that there was a fire on the fish dock," Monihan remembers. "When we got there, big pieces of sheet metal from the warehouse roof were falling red hot into the bay, making steam. Any one of us could have been beheaded."

As it happened, the University of Delaware maintained an oceanographic facility at the far end of the dock. Fearing the worst, Lewes' fire chief radioed the university for advice. "To the best of our knowledge," someone at the other end of the two-way set told him, "there is nothing hazardous on the dock." The chief had scarcely acknowledged the message when, according to Monihan, "a fireball went up."

"There's not a whole lot you can do at that point," he says. "I crawled under the truck while my driver dived into it headfirst. All kinds of junk was flying around, but nobody ran. That was one hell of an explosion: the fireball went a couple of hundred feet into the air. Grass was burning near the highway a half-mile away. We found out later it was a diesel-fuel tank that went off."

The chief ordered a general retreat off the dock, which meant the firemen had to drag their heavy "blitz lines"—two-and-a-half-inch hoses—behind them, and some of the hoses were fully charged with water. As Monihan struggled with his hose, he saw Ethel Maull go by with a line in each hand. She was the Lewes fire department's first woman volunteer.

"Wait a minute!" he shouted. "We'll help you."

"I'm doing all right," she called back.

With the pier lost, the task now was to save a fertilizer processing plant, which was now fully exposed. In order to gain height for their hose stream, Monihan and a young volunteer named Steve Brittingham climbed into an aerial basket and were propelled 30 feet above the ground. For a short while they felt relatively safe, but then: "The wind shifted. Suddenly we were enveloped by black smoke."

The thick smoke and debris forced everyone to flee the area, leaving Monihan and Brittingham stranded in their basket. "We had our own controls up there," explains Monihan, "but we couldn't see where we were going. For all we knew we'd be setting ourselves down onto live electric lines."

*"Are we going to die up here?"*

The air in their Air Pacs was not going to last forever. Through his mask, Brittingham was trying to ask a question. "He kept leaning into my ear, yelling something," Monihan recalls. "It sounded funny—kind of garbled and muffled." Eventually Monihan caught the drift. "Are we going to die up here?" Brittingham wanted to know. The answer was written in the wind, which mercifully changed course again, allowing the two volunteers to descend safely.

"When we hit the ground," says Monihan, "the first person I saw was Thornton Shipley, the man who'd been at the controls. He was struggling to get to the turntable, trying to save us. That's what I like about volunteers: you can depend on them."

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Missroon had made a similar point. "What attracts you is the camaraderie," he'd told me. "It's good to know there are people you can count on."

The tie that binds Morrisville's 35 volunteers stretches from childhood to the grave. If a fireman becomes ill, his colleagues will organize a collection to help defray medical bills. And if he is lying on his deathbed, he may have the satisfaction of knowing that his fellow volunteers will attend his funeral in full regalia, wearing black tape over their badges.

Lee Sturtevant recalls: "As early as I can remember, I wanted to be a fireman. Every time the siren went off I ran out and followed them." The fire department's youth auxiliary, ages 14 to 18, has more applicants than it can handle. Apparently kids still want to be firemen when they grow up. If most city children outgrow the ambition, many rural ones live to fulfill it. In joining the volunteers they partake of both the pride and the prejudice inherent in the calling. Glorying in the gratitude of their fellow villagers, the young men—and occasionally the young women—become part of an elite folk-corps, a company of heroic commoners routinely ready to perform miracles.

It was this abiding paradox, the seeming transmogrification of everyday neighbors into once-in-a-while giants, that startled me when the firemen came to douse my trash-can fire. Their costumes, of course, had a lot to do with my larger-than-life perceptions. Yet masquerade was not the whole story. Something in the volunteers' demeanor, a no-nonsense air of selflessness, won my respect and prodded my imagination. Perhaps they appealed to my fantasies, the part of me that yearned to go bravely forth and battle the elements. Maybe, at heart, we are all closet volunteers.

Chief Wayne Camley, left, and Dick Cleveland take a break at a practice session in Morrisville, Vermont. Camley, state's 1982 "Volunteer Fireman of the Year," is a 28-year veteran. Cleveland is a seasoned driver.

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*By Rainer Fabian and Hans-Christian Adam*

# In changing times, Japanese photos preserved the past

*They portrayed quaint scenes of 19th-century life, they were deftly tinted with watercolors and they were a big souvenir hit in the West*

When Commodore Matthew Calbraith Perry of the U.S. Navy dropped anchor in Tokyo Bay in 1854, Japan was one of the most isolated and obscure countries in the world. Naturally, Westerners were hungry for a glimpse of the exotic island nation and they did not have long to wait. Perry's visit led to the relaxation of old barriers against visitors in Japan, and photographers from Europe and America eagerly took full advantage of the new opening. Many of their pictures showed scenes of everyday Japanese life: gentlemen borne aloft in litters, kimono-clad maidens in the rain, barbers at work on their customers. Others documented more unusual events—acrobats forming a human pyramid, for example, and firemen at a New Year's celebration.

One thing most of those black-and-white photographic prints had in common was the fact that they were delicately tinted with watercolors to achieve an effect that was at once realistic and charmingly artificial. It was also enormously popular in the West. Collectors found the prints irresistible, tourists snapped them up as souvenirs, and by the late 1870s they constituted a distinct and distinctively Japanese genre of early travel photography.

One of the pioneers in the business was Felix Beato, an Italian photographer who set up shop in Yokohama in 1865. Beato took his own pictures and hired Japanese artists to color them. The artisans meticulously painted tree trunks brown, lips red, vegetables green and bamboo yellow. For eyebrows and the dripping branches of wisteria, they used very fine brushes —some consisting of a single hair.

Beato's studio was one of the best but at the height of the tinting fad, which began to peter out around the turn of the century, there were hundreds of others producing thousands of photographs each year. A conscientious painter might work 12 hours a day to finish just two or three prints; elaborate crowd scenes may have taken a week to complete.

The popularity of the photographs owed as much to content as to coloration. For subject matter, photographers took their earliest cues from Japan's traditional woodcuts, which typically depicted such felicitous scenes as women bathing in wooden tubs, picnics under blossoming cherry trees, and excursions to pastoral lakes. Eventually, tinted pictures represented everything from coolies drawing rickshas and geishas at their ablutions to young men in Samurai armor and groups enacting hara-kiri. Such standard fare satisfied Western demands for pictures of the "real" Japan, but the photographers were careful to meet the prevailing Japanese canons of harmony and beauty, as well. Before studio sessions, they carefully arranged kimonos, made up faces into smooth masks and chose perfect flowers for decoration.

Because most of the photographers were so preoccupied with traditional subjects, their quaint body of work contains few hints that Japan was undergoing a dramatic industrial and social revolution. The pictures show no railroads, no smokestacks and no people at work in the telegraph offices—but plenty of paper lanterns and Mesdames Butterfly. Brass gongs in mountain monasteries abound, but cotton mills and cement factories are conspicuous by their absence. Since the pictures were produced mainly for consumption abroad, they were perhaps the chief means by which Japan became known to the rest of the world. This may help to explain the utter amazement with which the West finally realized, about the time of the Russo-Japanese conflict, that the real Japan was not peopled entirely by geishas and litter bearers, but by industrial workers and businessmen as well.

Such, even in its infancy, was the power of photography to mislead as well as enlighten. Notwithstanding all of their stereotyping and sentimentality, however, Japan's tinted photos are an important historical record today. They give modern viewers an enchanting last look at a civilized and ceremonial society that was rapidly receding into the past even as Felix Beato and his contemporaries strove to capture, and color, its likeness.

*Journalists Fabian and Adam live in Hamburg. This article is adapted from* Masters of Early Travel Photography, *just published by Vendome Press.*

Artifice was everything in early Japanese pictures. This maiden "caught in a storm" was actually posed in a photographer's studio. To simulate wind, kimono was wired up; rain streaks were made later on negative.

Westerners loved photographs of hara-kiri scenes. Studio simulations showed realistically how nobleman (second from left) might disembowel self to gain lost honor. Friend in back ended suffering by decapitation.

Real warrior or studio actor? Whichever, model wears 1800s Samurai armor with ornamented metal plate.

In contrast to idealized scenes staged in early photos, this more realistic image documents Tokyo prostitutes.

"Sleeping girl friends" is the title of this harmonious set-up. Women could be servants or geishas; the objects carefully laid out in foreground include an ashtray, pipe, tobacco case, book. Tiny pillows protect hairdos.

Japanese firemen started wearing full-body tattoos in early 1800s; then, gamblers, laborers followed suit.

Pioneer photographer Felix Beato posed a barbershop quartet in his well-known Yokohama studio in 1860s.

Old-time fire brigades greeted New Year with acrobatic tricks. Annual exhibitions are still put on in Tokyo.

Acrobats are gone but pyramid's image lives on. Fans bear messages but only the three on the left are legible. They read (from bottom): *Koami-cho,* a street; *Hayama,* a place or a town; and *Ōatari*—a big hit.

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*Article and photographs by Peter Menzel*

# Butterfly armies are now under guard in annual bivouac

*In winter, clouds of monarchs coat the trees in the mountains of Mexico. This season peace may come at last to their sanctuaries*

The butterflies cover a tree trunk. In favored groves, the fragile fliers reach densities of four million an acre.

Every fall a hundred million monarch butterflies, fluttering clouds of black and orange, arrive in the mountainous fir forests of Mexico's Transvolcanic Belt. They have migrated from the eastern and central United States, flying as far as 1,500 miles to get there. At their favorite roosting sites they blanket the trees, particularly the Oyamel fir, reaching densities as high as four million per acre.

Since scientists first discovered the roosting sites less than a decade ago, efforts have been under way to protect one of nature's most breathtaking displays. Lumbering is a principal industry in these mountains, and the government has declared a moratorium on cutting trees in and around the roosts. It is good news for the butterflies, but not so good for the landowners who lose income and the campesinos who lose jobs.

Tensions sometimes run high. Armed guards patrol the sanctuaries, and scientific parties have been rousted from their camps at gunpoint. At least one shooting death has been blamed on the logging ban. A landowner has raised the threat that unemployed campesinos will torch the butterfly groves.

Last winter I visited several of the roosting sites, both because I wanted to photograph them and because I had been warned off with reports of trouble, especially the ambush in which one man was killed and two others wounded. I went first to a ridge in the Sierra del Campanario, where the largest colony overwinters. Signs declare the site a sanctuary, and a guard armed with a rifle is there daily from 8 to 5 (opposite). Just below the sanctuary, 34-year-old Artemio Martínez lives with his wife and children in a two-room plank house, an embodiment of the population pressure on the remaining forests of Mexico.

The smoke from an open-hearth fire made my eyes water when the wind blew through the wall. Between bites of stale bread and sips of steaming sweet coffee, he explained how difficult life was for him, and how convinced he was that things would be easier with two more children. "A family should have eight children," he said. "Because children die so easily, you need at least eight." Two months earlier, their seventh child had died at birth.

The rapidly expanding rural population in this part of Mexico relies mostly on subsistence farming and lumbering for survival. Family land is divided and subdivided, leaving each successive generation smaller plots. Near the sanctuary, farms have replaced forests on all but the highest slopes. A Third World cousin of suburban sprawl, "village creep" is threatening the butterflies' winter home.

Armed guard at a butterfly sanctuary in Mexico finds himself inundated by his responsibilities.

*Napa, California, photographer Peter Menzel has worked extensively in Latin America. He made several trips to Mexico while researching this article.*

*Magical groves where monarchs winter*

After a frosty night on a pile of cornstalks in Artemio Martínez's farmyard, I climbed up to the colony. Except for an occasional wood gatherer with a burro (nearly everyone cooks and heats with wood) and Roberto Esquivel Cruz, the guard, I was alone with millions of butterflies, all motionless. The top halves of perfectly shaped 100-foot fir trees resembled delicately sculpted, Halloween-colored pagodas. When the sun broke through at midday, the thin cold air warmed quickly and trees stirred with a sigh of relief as millions of monarchs took wing (pp. 178-79). A wide path bisecting the colony was soon so full of basking butterflies that it resembled the yellow brick road in Oz. An ethereal hum like soft rain in a forest rose in volume. Swirls of orange limited visibility. But all too soon gray clouds lowered the curtain on the aerial ballet.

Sanctuary landowner Mauricio Mondragón and his wife Leticia and daughters Georgina, left, and Leticia.

The next day, Saturday, I prodded my rented compact car over the tortuous burro path to the sanctuary, passing dozens of well-dressed tourists from Mexico City who had been forced to abandon their big cars miles from the site and walk in. Artemio's fence was lined with bottles of soft drinks that his children were selling to the sightseers.

I reached the colony just as a group of teen-agers began harassing the butterflies (opposite). Because it was once again cloudy and cold, few butterflies were stirring. So the leader of a group from nearby El Soldado climbed a tree and, to the delight of his younger female companions, shook thousands of butterflies from their resting places. Under the tree they soon lay six inches deep, flapping helplessly, unable to fly back up until they warmed. The girls squealed with delight as they scooped up handfuls of butterflies and dumped them over their heads, injuring many in the process.

Bolder tourists with cameras climbed the final 800 feet to the colony. There they breathlessly declared it was worth the pain, took lots of pictures, picked lots of flowers, and hiked back down to where several local women were selling food. Instead of cameras, a few teen-agers carried huge portable radios.

*Above the circus, an aerial dance*

The monarchs ignored the circus. But when the sun finally broke through and warmed the air, they repeated their aerial dance and everyone's spirits soared with them. The weekend guard never did climb the mountain to patrol the site. He stayed at the base, handing out leaflets and collecting tips for watching the four-wheel-drive vehicles parked nearby.

In contrast to the lax vigilance of this sanctuary, the second butterfly colony I visited is controlled by an old-fashioned cacique (chief or political boss) wearing khaki jodhpurs and a pith helmet. Jesús Avila Montes de Oca takes a personal interest in the monarchs. Five armed guards prevent tourists, who must walk an hour and a half and climb a thousand feet, from entering the colony at all. As William Calvert of the University of Florida and a group of helpers from Earthwatch—an organization that supplies amateur assistants to scientists in the field—mapped the colony, two armed guards accompanied them around the perimeter, ordering them to speak in low voices lest they disturb the butterflies.

The roosting sites had been known to the campesinos, of course, for untold generations. In the rain forests of San Luis Potosí, through which the butterflies move around November 2, All Souls' Day, local people believe the butterflies are the souls of dead children going to Heaven. The Mazahua Indians have a special word for "the butterfly that passes in October

Young tourists frolic with the immobile butterflies. Other sanctuaries are more tightly protected; even scientists are allowed only on the perimeter. The Mexican government is working to protect the roosts.

and November." Mazahua children would shake butterflies down from temporary roosts on frosty mornings. They were placed in large ceramic jars, later to be fried and eaten. Today the practice has been reduced to an occasional demonstration for the curious visitor.

Remarkably, however, the roosting places remained unknown to the outside world until 1976, when Fred Urquhart of the University of Toronto capped four decades of research with two articles describing them. Lincoln Brower, then at Amherst and now at the University of Florida, had spent years studying monarchs, especially their relationships to sometimes poisonous milkweed and to the birds that preyed on them. When he asked Urquhart where the colonies were, Urquhart refused to say, suggesting instead that Brower study monarchs that winter in the Florida Panhandle. But Brower dispatched Calvert, then his postdoctoral assistant, to find the sites. Using clues in the Urquhart articles, Calvert found a large colony in the mountainous state of Michoacán after just a two-day search.

"So you found them," said a disappointed Urquhart upon meeting Brower and his working group at the site shortly afterward. The two research teams spent a tense week together.

In the meantime, the research went on. Brower, Calvert and a colleague, Willow Zuchowski, discovered that even the selective logging practiced in Mexico could be detrimental to the butterflies. In a paper published last year in the *Boletín de la Sociedad Botánica de Mexico*, the three scientists suggested that during winter storms, which are at the killing threshold for the butterflies, every drop in temperature of a tenth of a degree could cause the death of thousands of butterflies. Temperatures fall rapidly in the mountains at night. In a thinned forest, more of the heat absorbed during the day can radiate away to the night sky. The difference may be only a couple of degrees, but such a difference can be all-important to the butterflies.

Thus the moratorium on logging in and around the roosts is considered crucial, even when it disrupts people in the area. One major butterfly colony, for example, is near land where the Mondragón family has been cutting trees and running a sawmill for years.

Overleaf: warmed by the sun, countless butterflies take to the air from their roost on an Oyamel fir.

Their wings folded so none of the brilliant orange shows, monarchs completely coat a tree at day's end.

Logging has stopped, the sawmill has been shut down, and the family has built a fence and posted guards to protect the monarchs.

Two years ago the family patriarch, Colonel Mondragón, his son Mauricio and a driver were ambushed as their truck crossed an arroyo; the driver was killed. Mauricio blames the shooting on campesinos who had lost their jobs.

Calvert has been allowed inside the fence to study the monarchs. One night last January, however, Mauricio Mondragón led an armed group into Calvert's camp. "We cannot guarantee your safety here, Calvert," he said, punctuating his sentences with flourishes of his semiautomatic rifle. "You'll have to leave. We couldn't protect you from angry campesinos who have lost their jobs. We have different opinions about what disturbs butterflies. We think it is noise from people like scientists and tourists. Noise bothers butterflies, except the noise of chain saws." Calvert moved his camp the next day.

The Mondragón guards treated everyone equally. Juan Luis Brunhuber, a young Mexican biologist commissioned by the Office of Parks and Reserves to survey the butterfly areas, had been warned by campesinos to avoid the guards. So for nearly a year he and three other researchers clandestinely made their studies. Their luck ran out last July, however, when they were stopped by six men armed with rifles and axes who could not read their official letter. After that episode, Brunhuber and company decided their nearly complete survey was indeed complete.

*Butterflies, chain saws and movie cameras*

Later, at his suburban Mexico City home, Mauricio Mondragón elaborated on his theory for me. "We took 12 chain saws and ran them all at the same time under one butterfly tree and nothing happened. Normal things, like animal noises, barking dogs and chain saws, don't bother them. But when a television crew came to film, the 'ultrasound' from their movie camera caused the butterflies to become sick and fall from the trees like leaves."

Some of Mondragón's opinions, like that about the sensitivity of butterflies to movie-camera sounds, appear to be minority views. Others on the scene dispute his contention that the campesinos blame the butterflies for the loss of lumbering jobs. Scientists and World Wildlife Fund representatives who have shown slides and given talks in the surrounding villages report that the campesinos, while certainly concerned about their rights, are genuinely enthusiastic about protecting the monarchs.

The Mexican government, through Alicia Bárcena, Subsecretary of Ecology, is working out agreements to

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protect the monarchs. They would ease restrictions on logging in the areas surrounding the colonies, but would still prohibit cutting trees within the roosting areas. A landowner would provide security and accommodations for researchers, and would even have the option to build aerial tramways over the butterfly colonies, perhaps tourist hotels and even wild-game parks.

"The problem with Mexican parks is that most of them are not owned by the government," says biologist Javier de la Maza, who is in charge of establishing sanctuaries in the new administration of President Miguel de la Madrid Hurtado. "Our park concept is different from the United States'. In the past they were established by repeated use. People begin to use them more and more and soon everyone comes to know them as parks. Fortunately, now we have biologists making these decisions and we are actively creating reserves and sanctuaries."

Progress has been made toward the establishment of permanent reserves. Lumbering permits in the major areas have not been renewed by the Subsecretariat of Forestry. Guards are now employed year round by the Office of Parks and Reserves. This year four rangers will educate tourists, supervise guards, keep tabs on the butterflies and research overwintering biology.

"We may have to make compromises," said Alicia Bárcena. "But we are a new office working under a new government in a country undergoing a financial crisis. In the monarch case we have to choose the most cost-effective way of saving the butterflies. We are doing everything possible to make a realistic type of refuge, one that can be visited—with the least damage to the butterflies."

The Mexican federal and state governments, along with the World Wildlife Fund and other independent conservation groups, are making jobs for the campesinos part of the arrangements. The principals were hoping to sign contracts by the end of October. Everyone concerned hopes that when the monarchs return this year, peace will reign in their magical groves.

Butterflies that have fallen to the snow may still survive if the ground warms up or if more snow falls to insulate them. But thousands die naturally each winter, especially when storms strike their roosts.

William H. Calvert

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PHILLIPS 66

*For additional information contact Ballet West, 50 West 200 South, Salt Lake City, Utah 84101.*

*By Nancy Jenkins*

# An ancient town is falling down: Can it be saved?

*Italian government is spending millions to rescue a water-damaged Orvieto, where traffic vibrations add to pollution woes*

Viewed from the top of one of the surrounding hills, Orvieto appears as an island in the early morning mist.

Spires of *duomo* dominate the skyline of endangered city that has already survived for some 30 centuries.

Cathedral steps may seem an odd place for a soccer scrimmage, but in the small and ancient Italian hill town of Orvieto, the magnificent Gothic *duomo*, with its mosaic facade glittering in the sunlight, is a sanctuary before which all of life's rituals are enacted. The *orvietani* pass it at least once a day, to meet and greet one another, take the sun, exchange news and gossip, show off the baby, eat a snack or smoke a cigarette and rest from the labors of shop and school. The topmost step of the *duomo* is a wide, smooth platform; its north side, shaded throughout the day, is especially favored by little boys playing soccer. Watching the concentrated intensity of their round, scrubbed faces, one would not guess that their world—Orvieto itself—is in the process of falling apart.

The town's very foundation—an outcropping of porous volcanic rock that rises more than 600 feet above the Umbrian plain—is collapsing. *La Rupe*, the Rock, as it is called by its modern inhabitants, absorbs the water that falls on it like an enormous sponge. Documents dating back to the 14th century have indicated that great segments of the cliffs have peeled away, crashing or sliding to the valley below, and yet the

Scaffolding covers the cliffs where workers have inserted metal rods to shore up the crumbling rock.

*Photographs by Thomas Höpker*

*Can Orvieto be saved?*

Orvieto's narrow streets and centuries-old buildings suffer damage from tremors of constant traffic.

town has survived. But the 20th century has brought the Machine Age with all its traffic and air pollution to Orvieto, a place that was originally built only to a scale of human needs. The fortresslike cliffs that rise above the Umbrian plain and surround the town are scored with vertical slashes and fissures, like a giant cheese that has been hacked at repeatedly. Along the southern edge of the escarpment, enormous scaffolding has covered the cliffside from top to bottom showing where workers have struggled against time and a constantly tightening budget to shore up the decaying platform on which the town stands.

From a distance, Orvieto is one of the most dramatic sights imaginable, a fortress crowned by towers and roofs and chimney tops. Soaring over it all are the slender spires of the *duomo*, one of several reasons why a million or more tourists, students, scholars and pilgrims stop each year in this little hill town just a 90-minute drive northwest of Rome.

Like many towns in Tuscany and Umbria, indeed throughout Italy, Orvieto has a history that plunges back through the millennia—Renaissance and Middle Ages, Roman and Etruscan eras, back at least as far as the prehistoric Villanovan culture that preceded the Etruscans. Although we know little about them, it seems certain that Orvieto was inhabited by Villanovans some 3,000 years ago. But it was under the Etruscans, as early as the fifth century B.C., that Orvieto first became prominent.

### *An easily defended natural fortress*

The attraction for the ancients, as it has been for quarrelsome generations since, was Orvieto's easily defended position. More than a million years ago a series of volcanic explosions throughout Central Italy laid down broad sheets, between 120 and 200 feet thick, of ash and other pyroclastic material which became the soft, easily worked tuff that is a favorite building stone throughout the region. The Paglia River and other smaller streams gradually cut away the soft stone from around Orvieto's site and left the present formation, a great mesa of porous volcanic rock. Whoever held this natural fortress also commanded the conjunction of the Paglia and Tiber River valleys and hence the main road north from Rome.

Things are not so different today, for both the major north-south rail line and the Autostrada del Sole, linking Rome with Florence and beyond, pass close by the base of the ancient formation. Each morning, up the winding road that leads to the town center, crawls an unflagging procession: hundreds of little Italian passenger cars, school buses, motorscooters, three-wheeled delivery vans; heavy trucks loaded with cement, with produce, with roofing tiles; huge trans-

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Spelunking team methodically searches through caves for water damage that threatens base of the Rock.

continental busloads of tourists, and smaller buses from the surrounding communities bringing people to market or to work. There are 8,000 people who live in the town center on top of the Rock; 4,000 more, on the average, come and go every day. Everything that is purchased, used or consumed in the town center must, with some minor exceptions, be brought in from outside. The old streets and buildings are suffering from pollution: vehicular exhaust; acid rain that gnaws at stone, corroding cornices, moldings, sculptured reliefs; traffic vibrations which set up a constant tremor like a low-grade earthquake that stops only late at night.

From the first settlement of the Rock, Man has made changes that affected the natural environment, but it was not until the first half of the 19th century that the pace of development picked up. The access road to the town, which had been relatively short and steep and passable only by oxen, was greatly modified with long ramps and hairpin curves to accommodate horses and carriages. Then, in 1889, the construction of a new and badly needed aqueduct increased the amount of water dispersion, adding an enormous burden to the already naturally weakened structure of the Rock. In the past decade, traffic vibrations and water runoff from leaking pipes have caused landslides and cave-ins with alarming regularity and frequency.

In Italy, funds for big public works programs of the sort that were obviously needed in Orvieto come from the national government, the wheels of which too often grind with languor. But ever since a major landslide in 1977, the government in Rome has been spurred on toward recognizing its responsibility to deal with what many saw, correctly, as a national calamity. "If there had been a sheep pasture on top of the Rock instead of the city of Orvieto," one young engineer said, "no one would have cared. But Orvieto is just as much our *patrimonio* as Venice or the Colosseum at Rome. It is part of our national heritage and all Italians have to be concerned."

It was not easy, and it is a tribute to the perspicacity of the city officials and their representatives in the national legislature that, after months of debate, a law was finally passed and money appropriated to shore up the walls of Orvieto and deal with the water problem.

On a sweltering summer morning, I set out with engineer Augusto Marasca to inspect the work that his firm, Geosonda-Grassetto-Sogestra, had undertaken on the Rock in the three-and-a-half years since the project began. We were below the Convent of Santa Chiara where the 1977 slide had done the most damage and where work was most urgently needed in order to prevent further harm.

Marasca, short, gray-haired and studious, stopped the car to point out the work in progress. "One of the recommendations," he said, "was to put up sustaining walls around the base of the cliff. But we decided to use the tuff, the rock itself, as a sustainer wherever possible. After all," he continued, "it is not simply an engineering problem but an important esthetic problem as well. We have to maintain the natural physical appearance of the Rock." Slender steel rods, 75 to 90 feet in length, with a resistance of up to 30 tons, were being inserted straight into the heart of the cliff every few yards to stabilize the geomorphic structure, while shorter rods, 18 to 30 feet long, were being put in at oblique angles to form a *cucitura*, a web of stitching, to reinforce the cliff face. We searched the dusty walls above us for evidence of the rods, but they had been concealed under plugs of tuff and a mat of vegetation and hardy shrubs.

"The worst part is along here," Marasca said, "be-

*Nancy Jenkins, author of* The Boat Beneath the Pyramid, *writes often about Mediterranean history.*

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## Life never looked so good.

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Detail of 14th-century relief sculpture located near *duomo* entrance shows evidence of pollution damage.

cause the south wall suffers from temperature extremes, especially in winter when it can get very hot by day and well below freezing at night. The cliff expands and contracts, water gets into the cracks and freezes, and when the ice melts, the stone breaks away."

Money is the constant problem. With funds allotted for only a few months at a time, the threat of a work stoppage is always a worry. The estimates of the amount of money it will take to finish the project now total $50 million. Unfortunately, because of the constant, cruel inflation that is a fact of life in Italy, today's figures bear little relation to those of tomorrow.

The movement to save Orvieto does not stop with the consolidation of the Rock, however. "The problem of the historic town center," they told me at Ricerche e Progetti (RPA, an engineering and land-use-planning organization in Perugia), "is the problem of traffic." The historic center of Orvieto is like the heart of any old Italian town, where the combination of monuments, museums, markets and a rich social mix—young and old, wealthy and poor, foreigners and families who have lived there for generations—makes it the most interesting and picturesque part of the city and the part that is best known to tourists. RPA has suggested "alternative mobility" as the solution to Orvieto's traffic problem. The idea is not to ban traffic outright but to provide alternative systems that are so attractive that only those with the direst need will resort to—especially—individual passenger cars. One alternative for Orvieto, suggested by RPA and already accepted, is both ingenious and traditional, involving the revitalization of an old waterpowered funicular, or cable-car system, that once led from the railway station at the base of the cliffs up to Piazza Cahen at the town's edge. Installed in 1888, the funicular continued to run, though with fewer and fewer passengers, until the early 1970s. The double set of tracks and the two stations still exist, but are in need of work. Hopes are to renew the system using electric power, and make it operational, with a capacity of some 1,300 passengers per hour, by 1990. The funicular will be linked to a large parking lot near the train station and to a system of small but frequent minibuses at the top to circulate tourists, students, workers and visitors around the town. The rejuvenation of Orvieto does not stop, however, with traffic control. There are ambitious plans for an archaeological park to encircle the base of the tuff cliffs where extensive Etruscan grave sites are located. Designs have been drawn to restore an older building for a library; restorations for a theater and conference center may follow.

How much more money will all this cost? The answer usually given is, Not as much as you would think. And balanced against the cost of the present situation—the cost of pollution and distress and damage to important buildings, not to mention the Rock itself—the cost of change has to be deemed worthwhile.

But the value of Orvieto cannot be expressed in monetary terms alone. High on its Rock the town is a living testament to the processes, natural and man-made, that created it. It may well be, as some archaeologists have speculated, the lost Etruscan sanctuary, the mysterious holy city to which the Etruscans made annual pilgrimage. It is certainly a priceless treasure house of medieval architecture. But more than monuments, Orvieto is also steep stone-paved streets and harmonious little sunlit squares where townspeople gossip and craftsmen bring their work out of doors.

The *orvietani* will not be forced off their Rock any more than the canals of Venice will be paved over or the forum in Rome moved out of town. Each place is unique in its history and geography as much as in the particular demands made on it by modern times. Yet the processes of dealing with these demands, when they are successful (and they often are not), are remarkably similar and involve efforts at all levels, from neighborhood to national government. In most cases, as in Orvieto, the funding comes from public coffers, but if the *orvietani* themselves were not moved to save their town, then no amount of talk or money from Rome would do so. Venerable old towns like Orvieto continue to be vital centers of 20th-century life: therein lies the problem as well as its solution.

Framed by bell-ringing automaton, the *duomo* glitters in the sun; townspeople are determined to save it.

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*By William H. Earle*

# November 18, 1883: the day that noon showed up on time

*Our forefathers reacted with mixed emotions as standard time replaced a befuddling network of local zones*

"As noon approached on Sunday, November 18, 1883, a group of somber men gathered in a telegraph office to wait."

As noon approached on Sunday, November 18, 1883, a group of somber men gathered in a telegraph office to wait. They studied the massive pendulum clock on the wall and listened to the long-and-short clicking of the messages arriving or departing over the wires. The office might have been in any major American city.

Suddenly the sound of the instruments changed: the clicking took on a staccato rhythm. The operators immediately stopped working. The expectant crowd around them tensed. In a few seconds, the staccato clicking gave way to a regular pattern that repeated itself again and again. To the trained ear, it spelled out four letters: "T-I-M-E. T-I-M-E. T-I-M-E."

That single word continued to arrive for 20 or 30 seconds. Then the rhythm changed again, this time to metronomic monotony: one click per second for 50 seconds. Then ten seconds of silence, followed by one click per second again for another 50 seconds. Finally, ten more seconds of silence followed by a final click.

Tension evaporated. Jokes and wisecracks erupted as each of the men in the crowd finished setting the pocket watch in his hand. The operators returned to work and their visitors departed. What they had witnessed was the birth of standard time and the death of one of more than 50 time zones that had existed in the United States when the sun rose that morning. By sunset, only four time zones were left. (To celebrate the centennial of the adoption of standard time, the Smithsonian's National Museum of American History will be exhibiting time memorabilia through May 21, 1984.)

The time map of America that emerged from the events of that Sunday 100 years ago is a familiar one: it was basically the same system of four time zones we use today. Far less familiar to Americans who grew up with the present system is the baffling time map with which our 19th-century forefathers had to contend before that Sunday in 1883: a bizarre patchwork quilt of more than 56 irregularly shaped time zones. Until then, each community had determined its town time by observing the location of the sun in the sky; sun-

*Illustrations by Mike Smollin*

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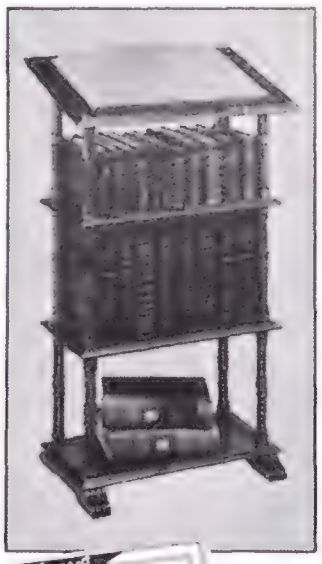

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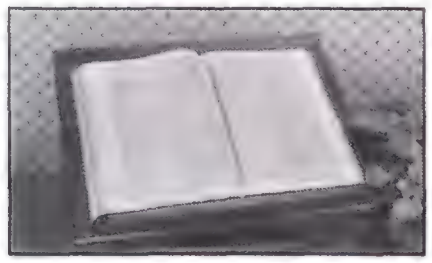

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"The public rejected metriclike measure dividing the day into ten equal parts."

dials divided the daylight hours.

The system of local time spawned great confusion because the standards did not differ from one another by an even number of hours or minutes, but by an odd number of minutes and seconds. Albany, New York, for example, was one minute and one second ahead of New York City; Baltimore was ten minutes and 27 seconds behind. Sacramento, California, was three hours, nine minutes and 51 seconds earlier than New York City, but three minutes and 56 seconds later than San Francisco.

The system was even capable of producing time warps. Time in Hagerstown, Maryland—which is some 60 miles west of Baltimore—should have lagged behind Baltimore time by strict geographic reckoning. In fact, however, Hagerstown was nearly six minutes *ahead* of Baltimore—because it adopted the Philadelphia standard brought to it by major railroads.

The infrastructure which maintained these cumbersome arrangements consisted of government and private observatories that monitored the Earth's rotation by star sightings performed on clear nights. The observatories' time was distributed by telegraph to a variety of consumers.

*William H. Earle is a free-lance writer whose home is in Baltimore.*

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Among these were operators of time balls which had been erected on the tallest buildings in New York, Boston and other cities. Shortly before noon each day, the ball—two to four feet in diameter—was hoisted to the top of its shaft by hand. It was usually held in place by an electromagnet, the circuit of which was broken by the observatory's telegraphic signal at noon. The ball's descent was visible for miles.

Among the consumers of time were railroads. A few minutes before noon, an observatory telegrapher would override traffic on the wires by keying the word "time" repeatedly onto the line, after which the movement of the observatory's transmitting clock would take over. An internal mechanism in the clock opened and closed the telegraphic circuit once each second, with gaps providing silences at predefined points. The final click after the second silence indicated noon. With watches set, train crews returned to work.

Also on the receiving end of observatory signals were jewelers and watchmakers. Private telegraph lines carried time signals to these craftsmen, who customarily maintained shop-window timekeeping devices as a public service. Checking his pocket watch against the clock in the jeweler's window was a standard feature of the businessman's day.


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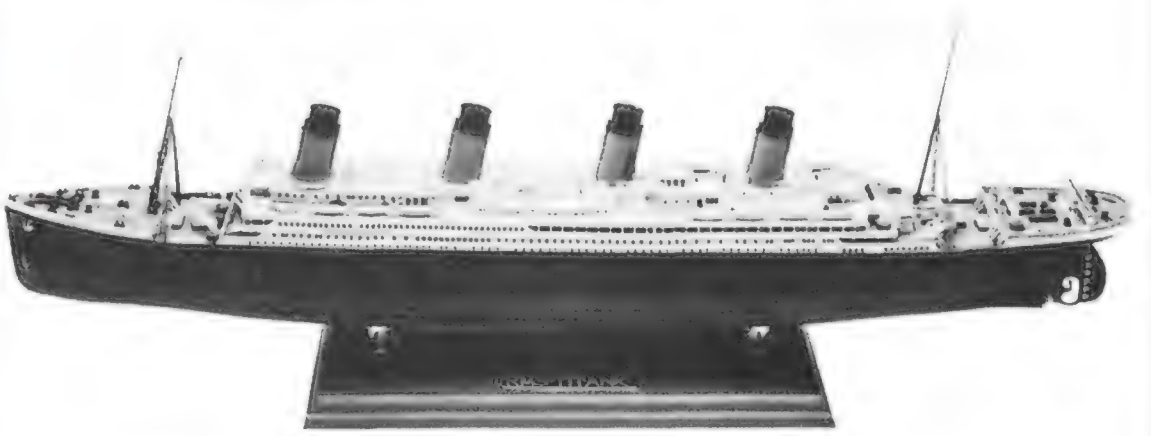

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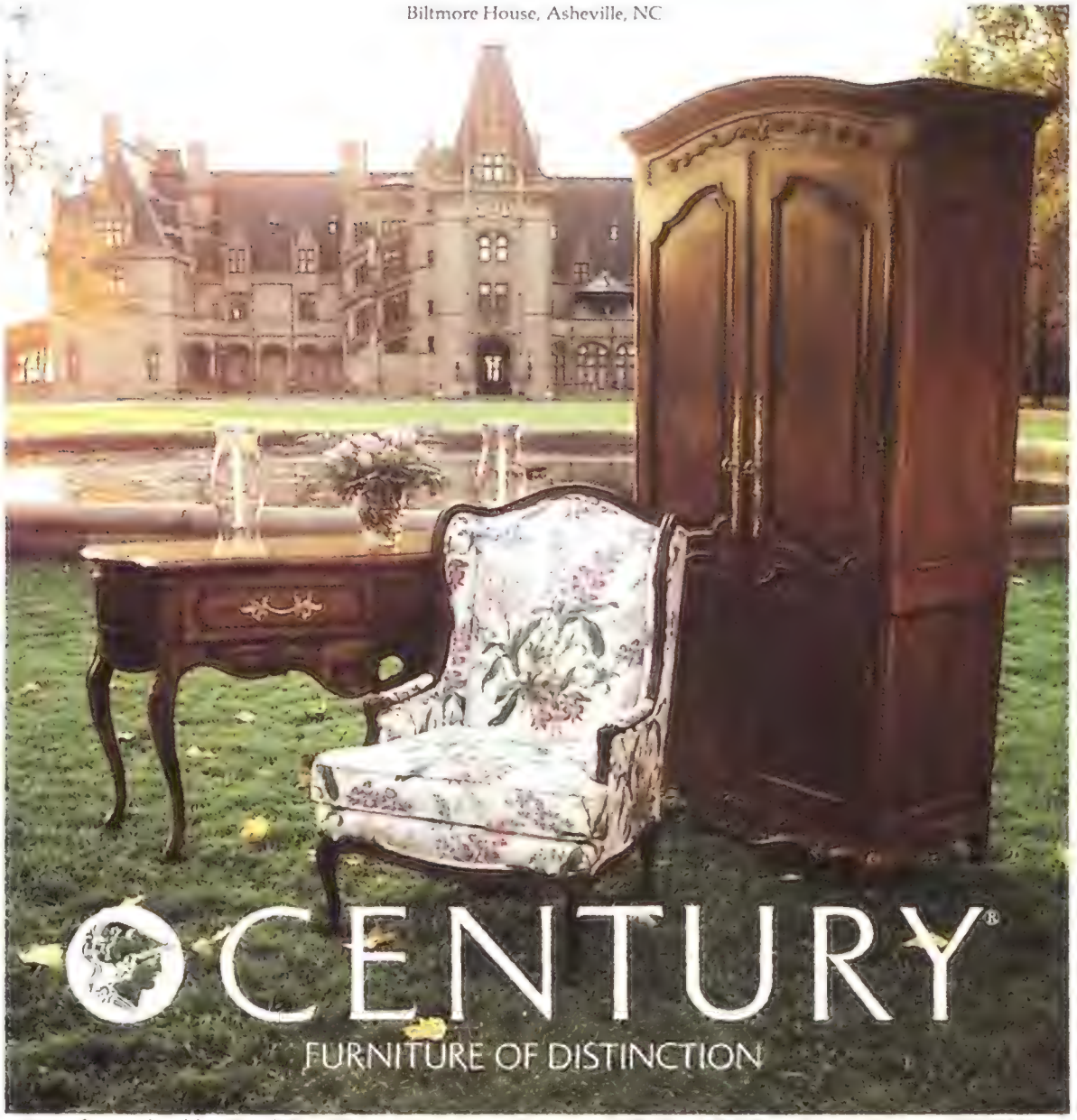


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The system worked, but it did not work very well. Time was indeed distributed to those who needed it, but the enormous variety of standards led to inevitable difficulties. The greatest number of problems—and those which were inherent in the system itself—affected travelers. According to one observer, "A traveler going from Boston to Washington would have to set his watch five times in order to keep correct time on the journey."

Before a traveler could even catch a train he had to calculate the difference between his town's local time and whatever time standard was used by the railroad. The traveler's greatest difficulty arose in those cities served by a variety of railroads—each of which might have its own time standard. Chicago's railroads, for example, employed three different ones.

Proposals for reform were not lacking. The earliest reformers were men of science: astronomers, meteorologists, educators and civil engineers (whose professional societies had established ad hoc time committees in the 1870s and early '80s). They saw standard time as both a practical means of organizing their work and an enlightened step along the path of progress.

The proposals foundered, however, through lack of public acceptance or impracticality. The public would not accept the 24-hour clock, for example, nor would it entertain the proposal to replace the hour with a new metric-like measure which would have divided the day into ten equal parts.

Single-meridian standards were also proposed several times: a single national time standard could be based on the meridian of Washington, D.C., or a meridian midway across the country. These proposals usually assumed that the single-meridian time would be used for railroad purposes, with the general public continuing to use local time for everyday purposes; therefore, they usually included diagrams for handy two-faced watches and clocks which would keep track

# How to tell original prints from cheap reproductions.

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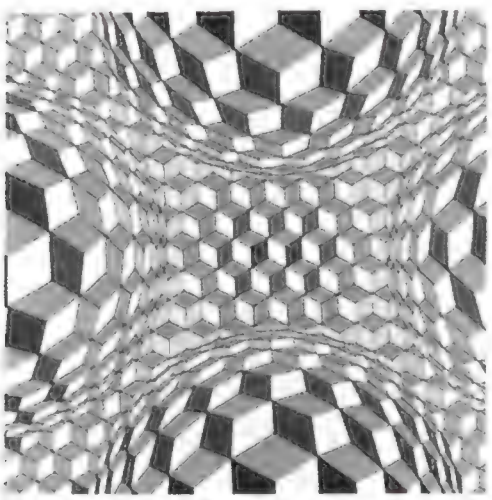

Victor Vasarely's *Cell-Kat*, original serigraph. Signed limited edition of 250.

Original prints, whatever the process used to create them, are "hand-pulled" under the artist's supervision, or by the artist himself. This means that any work produced photographically or by another purely mechanical process is not an *original* print.

If you examine a print under a magnifying glass and discover a regular pattern of small dots, you will know immediately that it is not an original work.

If the print is a serigraph (produced by a silkscreen process), the ink will seem rather like paint and appear to be sitting upon (rather than absorbed into) the paper. Etchings and engravings will produce a physical impression on the paper itself.

**Is the edition limited and is the print numbered? Did the artist personally sign the individual work?**

Contemporary original prints will always be signed in pencil by the artist himself, to indicate personal supervision and approval of the individual print.

Original prints are always produced in limited editions, at the most several hundred copies. If thousands of copies are available, then the work is almost certainly *not* original. (In most cases, to assure that the integrity of their work is not violated, artists will cancel the plate after the edition has been produced.)

The print will have a figure on its border, indicating the number of prints pulled and the number of the individual print in the sequence.

For example, the figure 50/100 means that the edition has been limited to 100, and that this is the 50th print pulled.

Jean-Luc Lecoindre's *Moret Sur Loing*, original lithograph. Signed limited edition of 175.

Franklin S. Galambos' *Spring Rains*, hand colored etching. Signed limited edition of 285.

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of both the local and standard times.

The first comprehensive proposal to standardize time came from Charles F. Dowd, head of a private school in New York. In 1869 he suggested a plan to divide the country into four "time belts." Many railroad officials commended Dowd's work but chose to ignore it. His plan seemed complicated, and with railroad passenger service still limited to short distances, the Railway Association asked in 1873 that it "be deferred until it more clearly appears that the public interest calls for it."

No scientist did more to publicize the need for standard time than Cleveland Abbe, the first official weather forecaster for the federal government and chairman of the American Metrological Society's committee on standard time. As the Director of the Cincinnati Observatory that provided that city with telegraphed time signals, he was in a position to argue for a uniform system of time as early as 1870.

Time reform remained the province of visionaries until late in 1879 when Abbe first circulated a report to the railroads which persuaded them to proceed with a time change. Then, in 1881, the American Metrological Society presented Abbe's report to the General Time Convention. The convention thanked the society, and referred the proposal to its secretary, William Frederick Allen, for action.

Allen was also the editor of *The Traveller's Official Guide*, a periodical of train timetables used by railroad officials to coordinate their schedules during that train-rich era.

Allen had been interested in the subject of time reform throughout the 1870s, but the Metrological Society scheme caused him to spend 18 months reviewing the problem all over again. Gradually, he narrowed the options. He rejected 24-hour clocks as visionary and single-meridian standards as impractical. His solution was a plan to divide North America into five zones each 15 de-

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*Indianapolis Sentinel* grumped that "The sun will be requested to rise and

grees of longitude and one hour wide. The governing meridians in each zone were those 60, 75, 90, 105 and 120 degrees west of Greenwich.

The even-hour concept and the particular meridians Allen chose had been suggested before, but the boundaries of the zones were his own. Some of the earlier proposals had featured zones which followed strict longitudinal patterns or state boundaries, but neither arrangement was acceptable to the railroads, the principal commercial interest involved. Consequently, Allen drew zigzag lines across the map to insure that time shifts occurred at points where railroad divisions ended.

There remained only one more conceptual leap to transform Allen's plan into the system we know today: the elimination of the use of local time. Allen seems to have believed at first that only railroads would use standard time; he even had his watch equipped with a second minute hand, one for local time, one for standard time. Prior to the fall of 1883 he realized that the use of local time could be eliminated entirely.

But before that could happen, Allen needed approval from his railroad and time-reform associates. He submitted his plan to them in April 1883, and then listened patiently to their complaints. Officials at the U.S.


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set by railroad time. The planets must . . . make their circuits by such timetables."

Naval Observatory still sought a single-meridian standard, arguing that multiple standards would "authorize the confusion" resulting from railroads "which vainly strive to suit local prejudices." Some railroad officials also lacked enthusiasm—Michigan Central, which had already consolidated its operations on a single-time standard, complained that Allen's plan would force it back to two standards.

In general, however, the proposal was received with enthusiasm. During the summer of 1883, Allen tallied votes by counting the miles of track controlled by managers who had agreed to the plan; by October, he was able to inform the General Time Convention that railroads operating on some 78,000 miles of track had agreed to the new system. The convention then approved it, setting noon on the 75th meridian, November 18, as the time for the shift.

The Time Convention also adopted Allen's resolution on the use of local time: "We suggest that the time used in all cities wherever possible should be made to conform to the new standard. . . ." The mild phrasing reflected the convention's recognition that it had no authority whatever to bring such a transformation about.

Allen tried to defuse the incipient hostility by recalling a story about a

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small religious sect which had once passed two resolutions. The first, he said, was that "The saints should govern the Earth." The second resolution declared, "We are the saints."

However, even Allen's storytelling could not mollify everyone who bridled against "railroad tyranny." The *Indianapolis Sentinel* grumped that "Railroad time is to be the time of the future. . . . People—55,000,000 of them—must eat, sleep and work as well as travel by railroad time. It is a revolt, a rebellion. The sun will be requested to rise and set by railroad time. The planets must, in the future, make their circuits by such timetables as railroad magnates arrange."

To overcome this opposition, Allen had to undermine the supports which propped up the old system. Since that system depended on local ordinances and customs, it had to be attacked at the local level. To accomplish this, Allen enlisted an army of lieutenants from the railroad industry and from among the scientists in the time-reform movement. Each took responsibility for a geographic area. Theirs was not a simple task. The notion of changing time was revolutionary. It was also confusing.

Nevertheless, by November 18 success was virtually assured. Some major cities were still holding out (Chicago and Washington were two of them, the first piqued because its meridian had not been selected for one of the zones, the second shackled by the Attorney General's opinion that only Congress could authorize changing the time standard of the District of Columbia), but enough major cities had endorsed the system at least to demonstrate its practicality.

However, the fact that local leaders had bought the new system did not relieve the apprehension many people felt. The *Washington Post* felt obliged to reassure those who feared that "this shaking up of time standards may endanger the stability of the universe."

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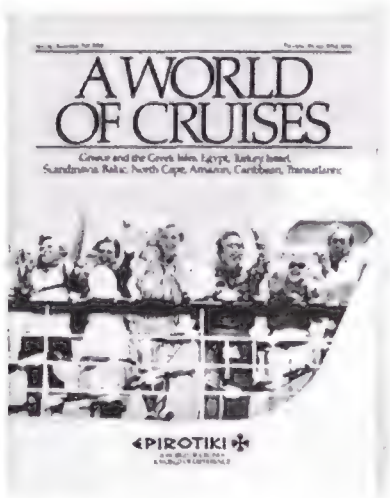


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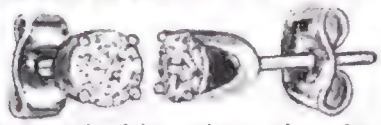

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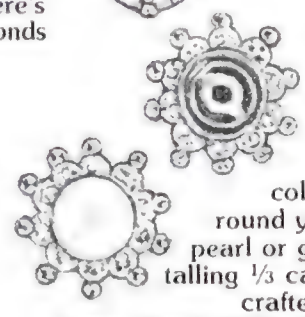

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noontime shifting on the 18th. In Boston, which had to stop its clocks for approximately 15 minutes to match Eastern time, the *Globe* described events in its newsroom after the pendulum of its giant clock had been stopped: "There stood the hands on the figure twelve, and you could have heard a pin drop. Time was at a standstill. 'I don't like this,' said the religious editor in a subdued tone; 'this is worse than Joshua making the sun stand still.' "

Elsewhere, the shift turned out to be something of an anticlimax. The crowd that gathered to watch the 36-second shift at Philadelphia's Independence Hall was reportedly bewildered "when, after half an hour's watch, no change was apparent. . . ." In New York, "There was a universal expression of disgust when it was discovered that all that was necessary to effect the change was to stop the clock for four minutes and then start it again. . . ."

One New Yorker who did not suffer from anticlimax was Allen, who took his family to the Western Union office from which New York's time ball was controlled. He pronounced himself delighted at being able to hear noon ring twice—once by old time, then again by new time—from nearby church steeples.

By April 1884, Allen could tell the General Time Convention that only five million of more than 50 million Americans remained on local time. By June, of the country's 100 largest cities, only 22—"for the most part unimportant"—were holdouts.

Among those "unimportant" cities were Louisville and Savannah, both of which had tried standard time briefly before returning to local time. Cities as "unimportant" as Cincinnati, Cleveland, Pittsburgh and Detroit had resisted standard time entirely, as had Bangor, Maine, the ferocity of whose resistance had raised it to the first rank of American metropolises.

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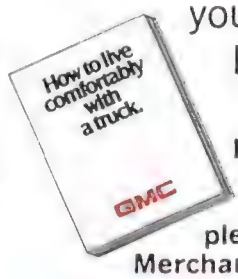


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Mayor Frederick A. Cummings twice vetoed city-council resolutions endorsing standard time. His rambling veto messages questioned the constitutionality of an "arbitrary standard" which would repeal "one of the immutable laws of God . . . [which] was undoubtedly established at the Creation, and has remained upon nature's statute book since that day."

The mayor's outbursts led one Boston paper to publish an editorial that appears to praise the mayor:

"The standard time can go east as far as the border of Bangor, but there the shameful acquiescence of the country to the gigantic railroad monopoly must stay its course. . . . Those who visit the city should also be made to regard the local time and compelled as soon as they set foot within its borders to hasten to City Hall and set their watches by the Mayor's time. The whole thing must be put in the hands of a special police force. . . . The eyes of the whole country are upon the Mayor of Bangor. . . . If he falters, the cause of the people falls never to rise again."

Bangor did not back the mayor unanimously. Democratic council members upheld their beleaguered leader, while Republicans asked employers to address the city council, asking them to adopt standard time on November 18th. But the obdurate mayor continued on course and announced that the police would arrest anyone attempting to change the hands of the city's public clocks.

The mayor's threat angered the congregants at two of Bangor's principal churches; two of the four clocks covered by the mayor's warning were in their steeples. If the mayor or anyone else attempted to prevent standard time from appearing on those clocks on November 18, trespass charges would be filed.

Thus did Bangor develop a time warp on the 18th. By the end of the day, two of the city's "public" clocks were some 25 minutes out of phase with the other two. The city's citizens were similarly split into two out-of-sync shifts: workers in private industry reported by standard time, city workers by local time. The impasse continued until a municipal election in March 1884, when Cummings was turned out of office—even as standard time was being defeated in a referendum, 2,320 to 406.

Cincinnati's opposition to standard time was led by a newspaper, the *Commercial Gazette*. From the day standard time was first mentioned, the *Gazette* maintained an incessant drumbeat of denunciation of the "monstrous fraud" which could alter the city's traditional time by some 22 minutes. "The idea that telling a lie by the clock, to the amount of 22 minutes, is progressive or scientific is worthy only of a crank."

Of course, history's judgment as to who the cranks really were was not apparent to the *Gazette*'s editors, whose misunderstanding of standard time was based on a simple misconception. The paper imagined that local time would continue to govern life in the city even after it had been replaced by standard time on the clocks. Thus one would catch a 2 P.M. train when the clock said 2 (since the

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railroads used standard time), but one would keep a 2 P.M. appointment in Cincinnati by showing up when the clock said 1:38.

During those brief lucid intervals when the editors did seem to comprehend that "real" time and standard time would be one and the same, they pointed repeatedly to an imaginary burden which would be borne by those whose lunches would arrive, day in and day out, some 22 minutes late. "It would be an outrage upon the public and an immense nuisance to sound noon 22 minutes late."

Perhaps Allen was right to ignore these ephemeral aberrations in his self-congratulatory speeches. After all, once his system was in effect generally, he could count on its simple practicality eventually overcoming even the most fervent opponents. That is in fact what happened during the next ten or 15 years, as one after another of the doubters gradually succumbed. Bangor made the switch quietly after one of Allen's lieutenants shepherded a standard-time bill through the state legislature in 1887; Cincinnati surrendered of its own accord—with the *Gazette* still grumbling, but quietly—in 1890.

Eventually, opposition faded, as did the recollection that such a thing as "local time" had ever been used at all. Still, it was not until 35 years after Allen's plan first went into effect, in 1918, that Congress finally adopted standard time formally for the country. It was approved at the same time that daylight saving time was adopted—but that's another story.

"The obdurate Mayor announced that the police would arrest anyone attempting to change the hands on the city's clocks."

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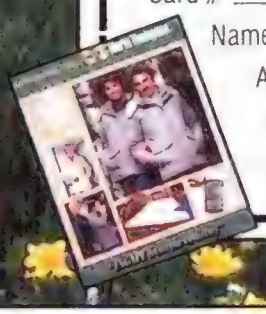

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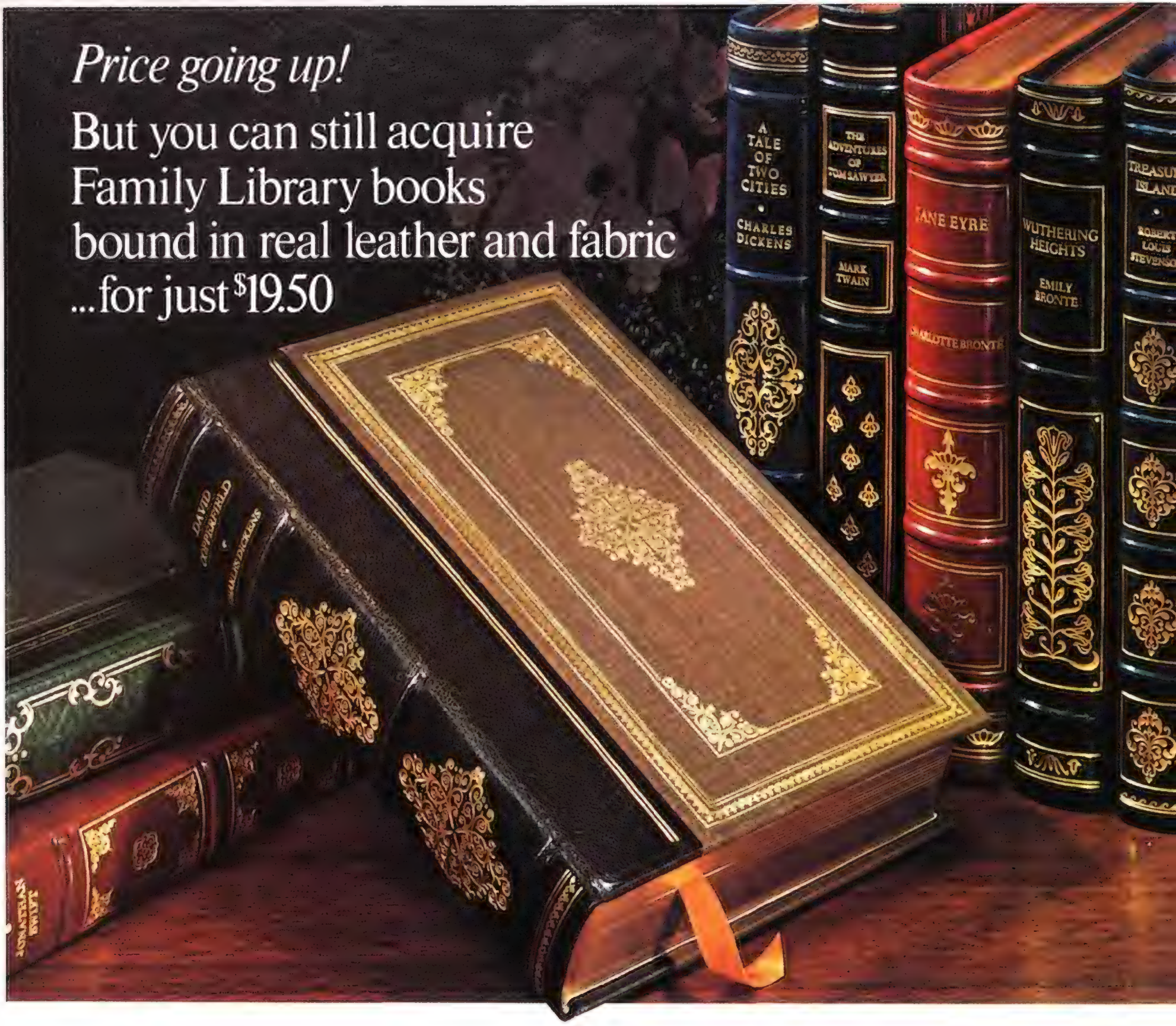


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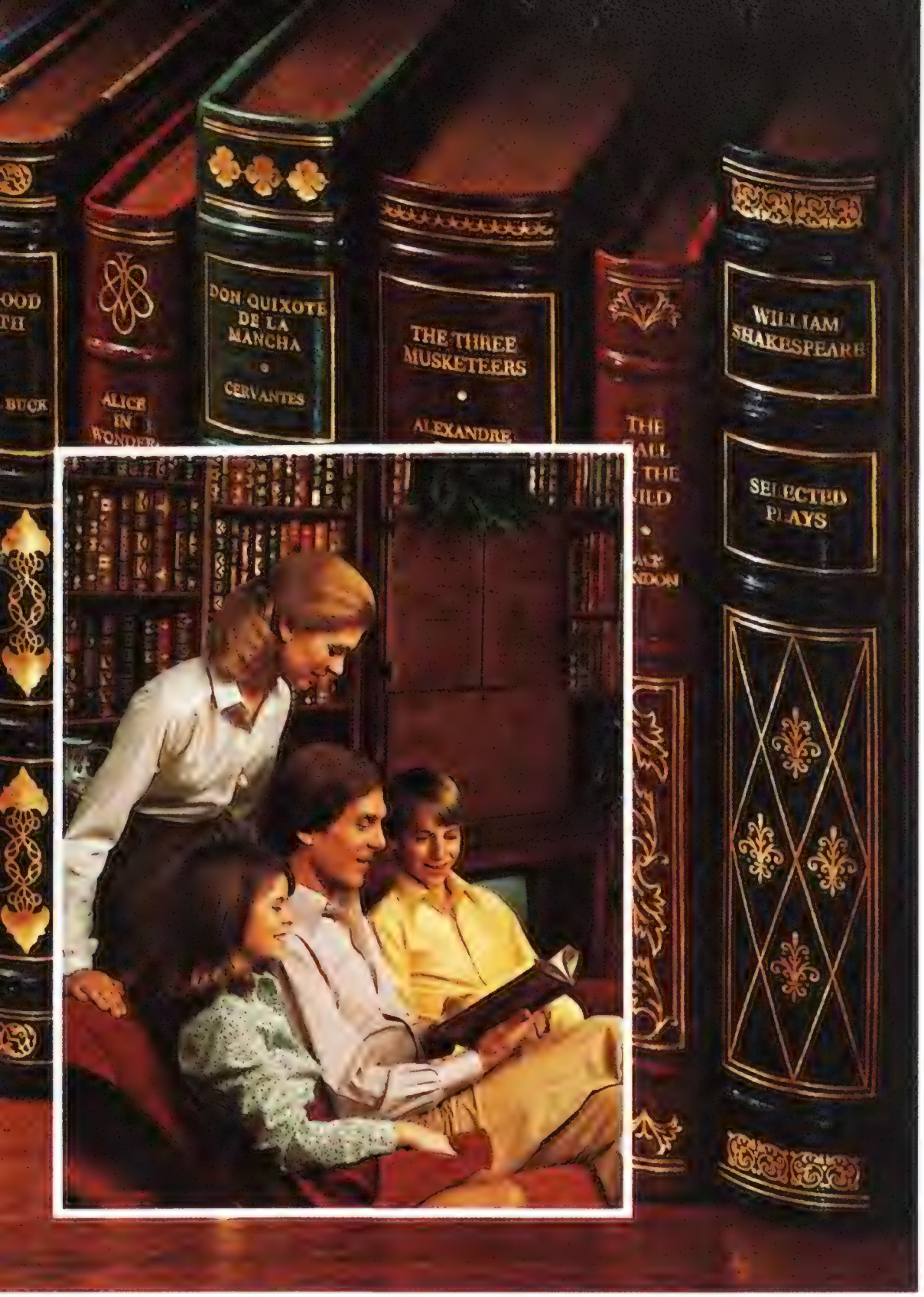


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In late 1920s, Boston's molasses tragedy (at far left in montage) was in the long ago, and a boy's dreams roved between Iver Johnson's sporting goods and the forbidden sport at the Old Howard.

*By Edwards Park*

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My target was always Iver Johnson's, the famous old sporting-goods store that captured the hearts of Boston lads in those days. It faced on Washington Street near the edge of Scollay Square, that opening in the cow-path streets where stood the Old Howard, a burlesque theater famous for supplementing the curricula of Harvard students. "Always Something Doing, One to Eleven, at the Old Howard" read its ads in the *Boston Globe*, followed by the titillating phrase, "25 Beautiful Girls 25." Scollay Square was off limits to me, and no wonder.

But Iver Johnson's was a wholesome interest. There I could wander through aisles flanked by baseball

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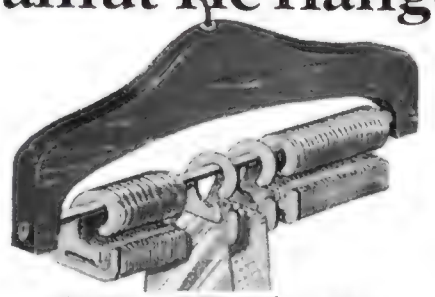

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bats; through thickets of split-bamboo fly rods and stubbles of short, steel bait-casting rods (fiber-glass rods and spinning reels were as yet unknown); through an arsenal of rifles and shotguns, blue steel barrels glinting against the warm-grained walnut stocks; and through a long array of heavy woolen winter clothes and thick leather hunting boots. Boys were under constant surveillance by supercilious clerks. I remember how surprised one of them was the day I actually *bought* something, but no matter. This was a place in which to build dreams.

Iver Johnson's displayed some of its own items in the window that overlooked Washington Street. Sleds shiny with varnish. Also, as I remember, a little .22 revolver. And bicycles. My two older brothers had both been given Iver Johnson bikes, and one of these fine old 28-inch wheelers was reposing in our basement, heavy with dust. It was supposed to be handed down to me, but there was now too much traffic in the Back Bay, even on Sunday mornings, for a kid to learn how to handle a big bike. I went without—and so learned to hate many aspects of modernity.

The way to reach Iver Johnson's was to take the subway to Park Street and walk northeast to a wonderful little byway called Cornhill, which pitched downward to Washington Street. You could smell Cornhill before you reached it because at its upper end was the Phoenix, a coffeehouse marked by the aroma of freshly ground beans. The rich scent filled the streets around and lured customers by the score.

Along with the coffee smell was another, equally pervading. One could discern throughout much of downtown Boston, and especially around the North End, the unmistakable aroma of molasses.

As a boy, I never questioned that odor, so strong on hot days, so far-reaching when the wind came out of the east. It was simply part of Boston,

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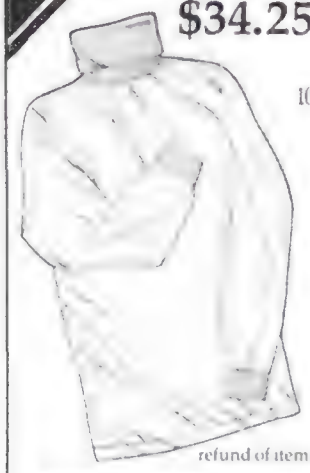

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In the mid-1920s, when the wind came out of the east, the odor of molasses was simply part of Boston, along with kids on the Common, swimming in Frog Pond.

along with the swan boats in the Public Gardens and the tough kids swimming in the Frog Pond on the Common. But years later, when I was on the staff of the *Boston Globe*, I asked a colleague about it. We were walking over toward the North End, beyond Hanover Street, and our taste buds were guiding us toward one of the corner trattorias where North End Italians make, I swear, the world's finest pizza. I was thinking about the smell of pizza, and for once I was annoyed by that other smell—the Boston smell.

"Why does Boston smell of molasses?" I asked my friend.

He looked at me curiously. "Because of the molasses flood, of course," he said.

"Molasses flood?"

"Yeah. The thing we do special stories on every ten years. Haven't you worked on one yet?"

*Contributing Editor Park, whose articles often appear in these pages, has never quite left Boston.*

I admitted I had not. And then the little restaurant came into view and we entered and sat down to pizza and kitchen tumblers of cellar-made Italian wine. And I forgot molasses for a number of years.

My old paper did short memory pieces about the Great Boston Molasses Flood on ten-year anniversaries of the event, which occurred in 1919. I didn't happen to work there in a year that had a nine at the end of it, and so remained largely ignorant about the original disaster. Older friends and relatives recalled it, but not very accurately, or in much detail. To learn more, I recently dug into the files of the *Globe* and pieced together fragile bits of brown newsprint as best I could . . .

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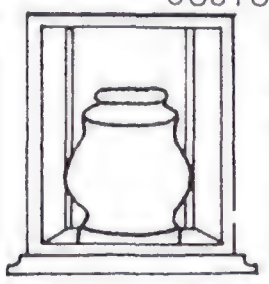

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Copp's Hill will probably bark its whitewalls on both curbs. At the foot of the hill, at Salem Street, is the Old North Church where two lanterns were hung as a signal to Paul Revere, and in a little park next to the church is a statue of Revere himself. Old men sit by the statue on sunny days, playing checkers and arguing dramatically in Italian. Copp's Hill is right there in the North End, Boston's Little Italy.

Commercial Street. It loops around the salient of Copp's Hill from the Charlestown Bridge, east and south, to link with Atlantic Avenue. It roars with traffic—and it did so in 1919, but with different sounds. Instead of the thunder of today's diesels, there was the unmuffled blat of loaded lorries with solid rubber tires, the endless clop of work horses pulling freight wagons and, over all, the roar of the relatively new elevated railway—the "El"—that for years kept Commercial Street in shadow.

On the water side of Commercial Street, opposite Copp's Hill, there stood in 1919 a giant storage tank. It had been built four years before by the Purity Distilling Company—massively constructed, with great curved steel sides and strong bottom plates set into a concrete base and pinned together with a stitching of rivets. It was built to hold molasses, that old Colonial commodity that stirs schoolday memories of the "triangle trade": slaves from Africa to the West Indies; molasses from the West Indies to New England; rum, made from the molasses, back across the Atlantic for a cargo of slaves. The old triangle had long been broken by 1919, but New England still made (and makes) rum, as well as baked beans, and the molasses for both still came (and comes) north from the Caribbean and New Orleans. In 1919, Boston's Purity tank could hold about two and a half million gallons of the stuff.

January 15, 1919. The weather had been mild for Boston—close to 40 F—and the streets were bare of snow.

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Two months before, the Great War (to end all wars) had ended, and the Yankee Division, the 26th, was coming home soon. That bloody adventure was over, and the nation was about to enter a great experiment—Prohibition. One more state was needed to ratify the 18th Amendment, and a vote was scheduled the next day. With an eye perhaps to the future, Purity Distilling Company had sold out in 1917 to United States Industrial Alcohol. Thus that huge molasses tank, 50 feet tall and some 90 feet in diameter, could legally continue to supply alcohol to industry.

The big Boston tank was just about full. A ship from Puerto Rico had brought its contents up to about 2,300,000 gallons a few days before.

At noon on this January day, work around the molasses tank routinely slowed as laborers took time out for their sandwiches and coffee. Men paused to eat and chat in a shack owned by the Paving Department, which shared the open area where the tank stood. Others were doing the same at the quarters of a Boston Fire Department fireboat on the waterfront side of the tank.

They were most probably discussing baseball—Boston had won the World Series in 1918—and a new film called *Shoulder Arms* which was Charlie Chaplin's satire on life in the trenches. They probably mentioned politics, for President Wilson was in Europe trying to get a peace treaty based on his Fourteen Points. Moreover, Theodore Roosevelt had died only two weeks before, and like him or not, you had to admire the man, even if you were a Boston day laborer.

They would certainly have been hashing over Boston's own politics, ever a fascinating subject. Ex-Mayor John J. Fitzgerald was by now out of the picture and these workmen probably said, "More's the pity," for "Honey Fitz" never lost sight of his Irishness and seemed a darlin' man to the workers, despite all the stories of graft. One of his grandsons—the one


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named for him: John Fitzgerald Kennedy—would be two years old in May. Fitzgerald himself had been born in the North End back when it was Irish and not yet Italian.

And certainly the flu epidemic would have been on the tongues of these workers. It took some 20 million lives around the world, more than half a million in the United States. There was nothing a man could do about it, it seemed, except go regularly to church and burn a few candles. But these men needn't have worried about the flu that day, for their own particular disaster was on the way.

At about 12:30, with a sound described as a sort of muffled roar, the giant molasses tank came apart. It seemed to rise and then split, the rivets popping in a way that reminded many ex-soldiers of machine-gun fire. And then a wet, brown hell broke

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loose, flooding downtown Boston.

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When the molasses wave hit houses, they "seemed to cringe up as though they were made of pasteboard," wrote one reporter. The Clougherty home at the foot of Copp's Hill collapsed around poor Bridget Clougherty, killing her instantly. And when pieces of the tank hit a structure, they had the effect of shellfire. One jagged chunk smashed

Many buildings succumbed to the force of that torrential, 35-mph gooey tide.


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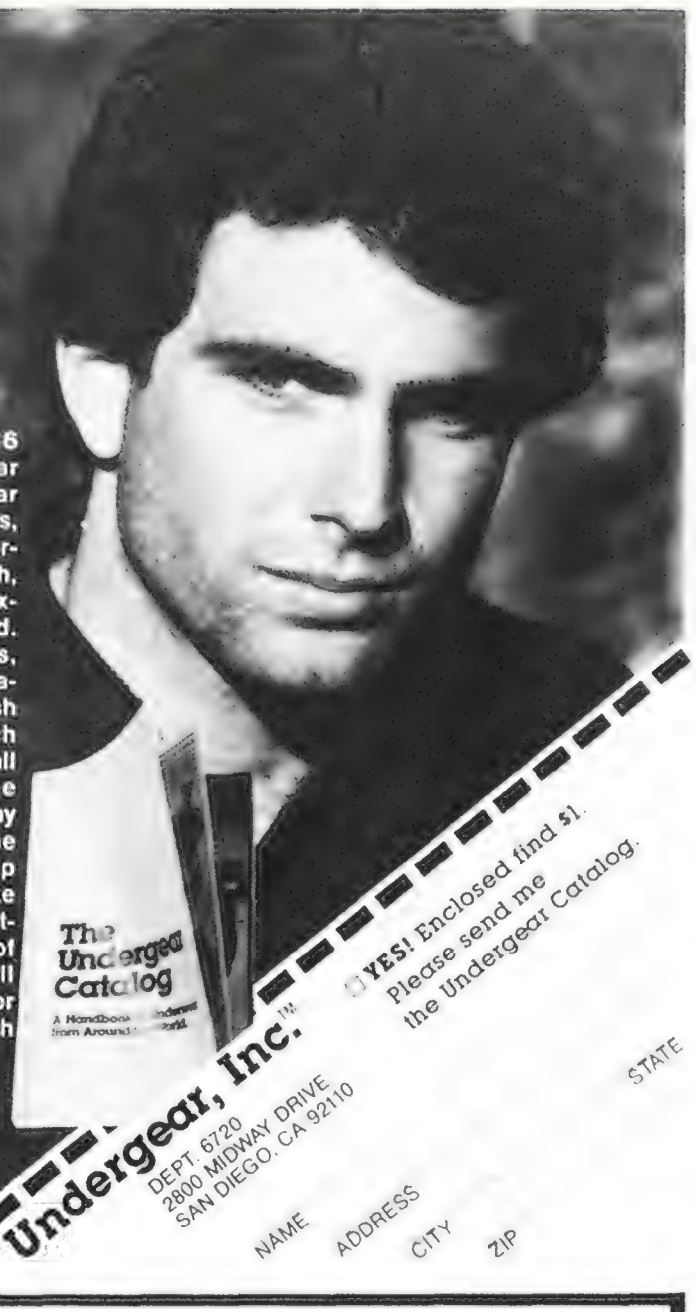


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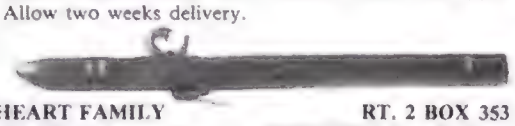

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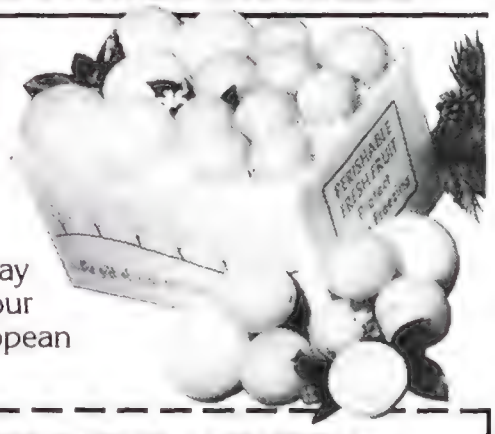


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The great brown wave caught and killed most of the nearby laborers. The fireboat company quarters was splintered. A lorry was blasted right through a wooden fence, and a wagon driver was found later, dead and frozen in his last attitude like a figure from the ashes of Pompeii.

How fast is molasses in January? That day the wave moved at an estimated 35 miles an hour. It caught young children on their way home from the morning session of school. One of them, Anthony di Stasio, walking homeward with his sisters from the Michelangelo School, was picked up by the wave and carried, tumbling on its crest, almost as though he were surfing. Then he grounded and the molasses rolled him like a pebble as the wave diminished. He heard his mother call his name and couldn't answer, his throat

Search for victims went on for days; the final toll was 21 dead, 150 injured.

was so clogged with the smothering goo. He passed out, then opened his eyes to find three of his sisters staring at him. (Another sister had been killed.) They had found little Anthony stretched under a sheet on the "dead" side of a body-littered floor.

The death toll kept rising, day after day. Two bodies showed up four days after the tank burst. They were so battered and glazed over by the molasses that identification was difficult. The final count was 21 dead, 150 injured, a number of horses killed. The molasses wave, after spreading out, covered several blocks of downtown Boston to a depth of two or three feet. Although rescue equipment was quick to arrive on the scene, vehicles and rescue workers on foot could barely get through the clinging muck that filled the streets.

A news reporter later remembered seeing Red Cross volunteers, Boston debutantes in smart gray uniforms

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with spotless white shirtwaists and shiny black puttees, step determinedly into the deep brown muck. In a second they were gooey and bedraggled, plunging through the flood that sucked at their puttees.

Apparently one reason the ambulances arrived so soon was that a policeman was at his corner signal box, making a call to his precinct, when he glanced down the street and saw the brown tide slithering toward him. You can hear in your mind his gasp into the phone: "Holy Mother iv God! Sind iverythin' ye can—somethin' tirrible has happened!"

Most of the facts about the Great Molasses Flood emerged in the findings of the lawsuits that swamped Boston after the event and were just as sticky as the molasses. Litigation took six years, involved some 3,000 witnesses and so many lawyers that the courtroom couldn't hold them all.

The reason for the lawsuits was disagreement as to the nature of the disaster. What in the world had caused it? Three explanations arose: there had been an explosion inside the tank (in which case the fermentation of the molasses would be to blame); there had been a bomb set off (not so wild a possibility in those early days of Bolshevism—bombs had already blasted a few American industrial plants); there had been a structural failure of the four-year-old tank (which made United States Industrial Alcohol liable).

But for its rivets, fragment of molasses tank could be crumpled piece of tin.


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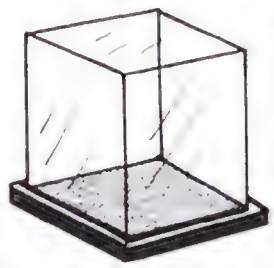

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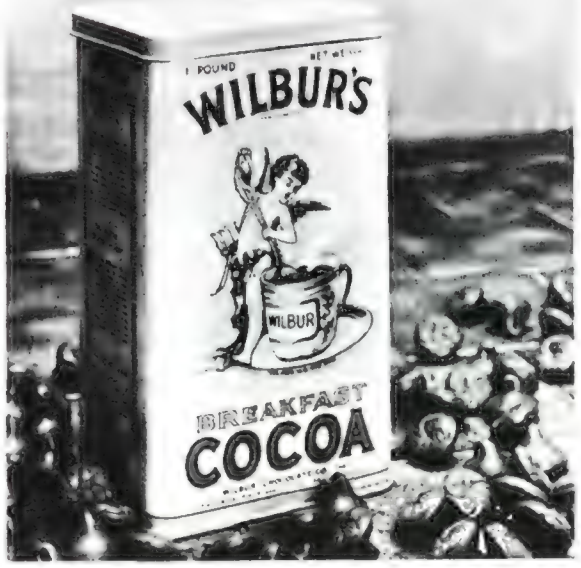


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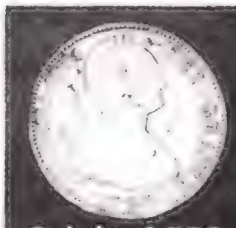

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Eventually the court found that the tank had simply ruptured because the "factor of safety" was too low. In other words, inspections hadn't been tough enough. The company was held to blame for the horror. Settlements of more than 100 claims were made out of court. Industrial Alcohol paid off between $500,000 and $1,000,000. Survivors of those killed reportedly got about $7,000 per victim.

Molasses is the main byproduct of the manufacture of sugar from sugar cane. It results from the continued boiling of cane juice—reminiscent of the boiling off of maple sap to produce maple syrup. When enough reboiling has gone on to wrench every bit of sugar out of the molasses, the resulting viscous liquid is blackstrap, the extra-thick molasses used as an additive in cattle feed. It provides valuable carbohydrates in the diet of

When tank blew out, one section hurtled into the El and buckled it (upper left).

a cow. (In ours, too, it seems. Recently, molasses has excited natural-food addicts as a sugar substitute.)

Back in 1919 you couldn't have given the product away in Boston. The gluey chaos caused by the flood was cleaned up by hosing the area with salt water from fireboats and then covering the streets with sand. The trouble was that all the rescue workers, clean-up crews and sightseers, squelching through the molasses, managed to distribute it all over Greater Boston. Boots and clothing carried it into the suburbs. Molasses coated streetcar seats and public telephones. Everything a Bostonian touched was sticky. There is a report that molasses even got as far as Worcester. Certainly the inner harbor turned brown as the hoses washed the goo into the bay.

As the rescue workers and clean-up


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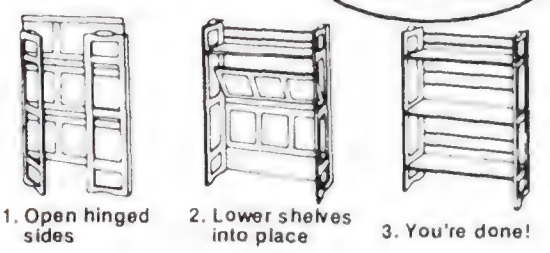

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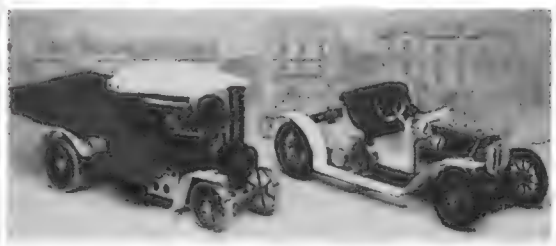

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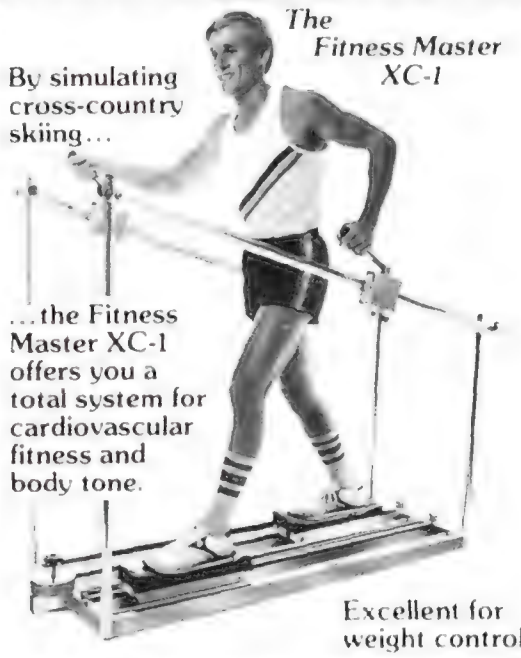

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crews tackled the incredible mess the night of January 16, they paused in puzzlement at the sudden ringing of church bells all over downtown Boston. Nebraska had voted on the 18th Amendment and ratified it. Prohibition was law, and churches which had campaigned for it in their pulpits now celebrated. Men up to their ankles in the makings of rum listened for a moment and went back to work.

The smell of molasses remained for decades a distinctive, unmistakable atmosphere of Boston. My boyhood association of the sweet aroma, mingled with the fragrance of coffee from the Phoenix, led me into a habit I still enjoy, though most other people seem to shun it: I invariably sweeten my first cup of early morning coffee with a teaspoonful of dark molasses. To me, the two go together.

But the Phoenix coffeehouse did not prove as permanent as the morning ritual it inspired. It was sacrificed to the great rebuilding of the inner city which took place mostly in the 1960s, and, unlike its namesake, it has not risen again. Even Cornhill has gone. Even the Old Howard. Even Iver Johnson's. And finally, even the smell of molasses. I passed the site of the catastrophe recently and found that there is little to show for it. Copp's Hill is the same as ever, but the El is gone, and the old waterfront, once so messy with decrepit warehouses, has been largely redesigned and landscaped. Where the great doomed tank once stood, there is a park filled with swings, slides and the shouts of children, and next to it, an enclosed recreation center.

A retrospective account of the flood indicated that the "high molasses mark" could still be seen on walls and buildings in the area. I looked and saw a dark stain—but it was just a city stain with nothing to indicate that the gush of molasses had lapped that high and painted the stone brown. I couldn't even find a plaque, not the merest marker to remember the 15th of January, 1919. I sniffed the dark stain. Nothing.

But as I get older, early impressions express themselves suddenly and in strange ways. And as everyone knows, nothing is more nostalgic than a smell or a taste. One morning, not long before I started looking into the story of the flood, I was drinking my early coffee, hot and delicious, with just that faint touch of molasses to give it special meaning. And inexplicably I said, "I wish I had a bicycle."

"What on Earth *for*?" my wife asked me.

"I don't really know, come to think of it," I answered.

A dollop of molasses in his morning coffee still evokes in the author memories of Boston scents of his childhood—and the bicycle he never got.

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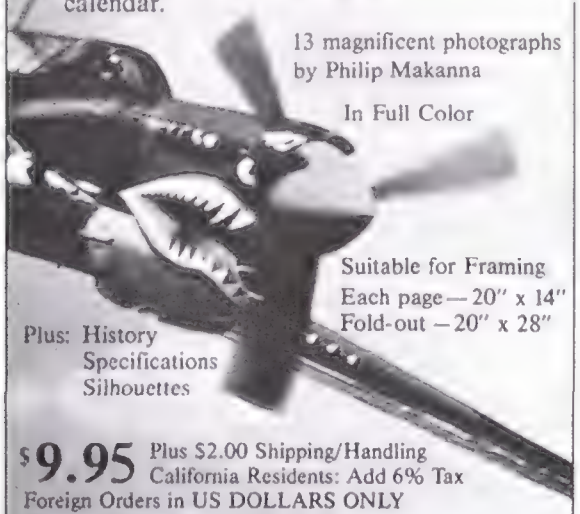

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# *Book reviews*

*Man on Earth: How Civilization and Technology Changed the Face of the World—A Survey from Space*
Charles Sheffield
Macmillan, $29.95

This is a delightful book. Its subtitle is straightforward, although somewhat overblown. This is really the story of Landsat, that remarkable series of satellites first launched in 1972, which crisscross our planet and compile, day after day, a library of its surface secrets. This information can then be processed in many different ways to assist us in determining what we are doing right or wrong with our technology.

From the moon the Earth appears mostly blue (oceans) and white (clouds). The land masses (with the exception of the rust smear which is the Atlas Mountains in North Africa) are nondescript, and it is difficult to differentiate the green of jungles, forests and fields. From Landsat's orbital altitude of 570 miles, considerably more detail is visible. Objects the size of a football field can be picked out. While this threshold of detail, or resolution, as it is called, is far inferior to that provided by the ultrasophisticated optics of a spy satellite, it is nonetheless sufficient to trace clearly what Man (or whoever) has done and is doing to the surface of our planet.

The most interesting thing about these photographs, it seems to me, is their startling color. Landsat presents the more-than-a-million bits of information it returns to Earth each second in "false-colour." In this system, infrared is shown as red, red becomes yellow and yellow is blue. As the author explains, "In such a

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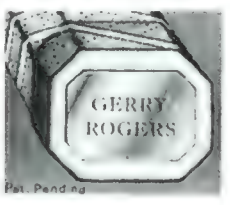


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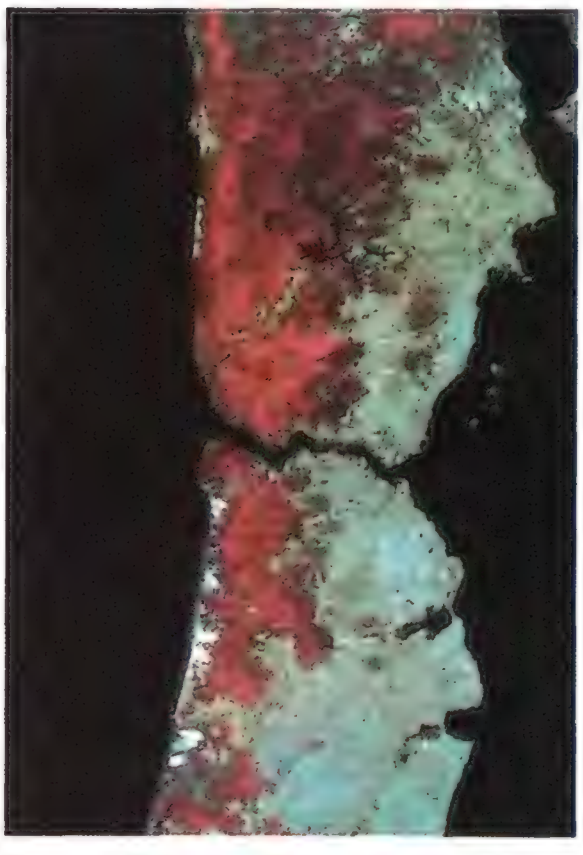
presentation, crops and other vegetation usually appear as shades of red, urban areas as grey or grey-blue, clear deep water as black, and muddy or shallow water as various shades of blue."

In other words, the shapes are as precise and familiar as in the family atlas, but the colors are strange, slightly offbeat and weirdly beautiful. Furthermore, although only one out of the 68 photographs is so altered, colors can be further manipulated by computer to highlight variations in surface composition or structure. I would like to hear author Sheffield explain a bit more about this process, because herein lies the secret to using Landsat effectively—to delineate rock formations which show promise of producing oil, or vegetation patterns which indicate the presence of underground water.

The photographs selected cover only a tiny fraction of the Earth, and they have been divided into eight sections: The Ancient World, Shaping the Earth, Commerce and Trade, Energy and Minerals, Strategic Pressure Points, Food and Fibre, Capital Cities and The Changing Wilderness. These subdivisions are arbitrary and somewhat confusing. For example, one finds Paris under Capital Cities, but Rome under The Ancient World, and Moscow under Strategic Pressure Points. Washington one finds not at all, although



Strategic Bosporus Strait separates Asia (top) and Europe. Black Sea is to left.

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San Diego, Chicago, Alamogordo and New York are included. Not only do I miss Washington, but I would prefer to see the fresh lava flows on Hawaii or the convolutions of Southern California, which contrast Mt. Whitney with Death Valley, rather than the Ubolratna Dam in Thailand. But these are personal choices, and in general there are sound reasons—technical or esthetic—for picking these 68. However, it definitely would help to have a one-page visual index, a world map showing the coverage which the author expresses instead in a conventional word index of names and places.

The words which accompany these magnificent photographs do them justice in most cases. At best they are brilliant essays (such as the introduction to The Changing Wilderness); at worst they include quaint asides (on northern Bathurst Island, a compass needle "will seek to move to a vertical position").

In some cases the photographs speak for themselves and it seems almost trite to comment on them—but not always. For example, page 41, identified as the Aswan Dam, appears instead as an abstract canvas, rich in texture, gorgeous in color. Indeed, it is not the hand of Man, but rather the fundamental beauty of the planet which shines through in this lovely volume.

*Michael Collins*
Astronaut, author of *Carrying the Fire*

*Late Night Thoughts on Listening to Mahler's Ninth Symphony*
Lewis Thomas
Viking Press, $12.95

Essayist Lewis Thomas has been swimming upstream for a long time, maintaining a wry but optimistic viewpoint while contemplating with grace and wit the wonders of the natural world and the triumphs and follies of our species (SMITHSONIAN, April 1980).

In *The Lives of a Cell* and *The Medusa and the Snail* he gently astonished us with the breadth and penetration of his thoughts and his mastery of language. One could only hope for more, and then still more.

It was too much to ask of such an unflinching thinker. In this his third collection of essays, Thomas has begun to succumb to the psychic abrasion of our age. In the concluding essay, from which the title of the book is taken, we learn that even music—the continuing solace of his life—has soured for him:

"Now I hear it differently. I cannot listen to the last movement of the Mahler Ninth without the door-smashing intrusion of a huge new thought: death everywhere, the dying of everything, the end of humanity. The easy sadness expressed with such gentleness and delicacy by that repeated phrase on faded strings, over and over again, no longer comes to me as old, familiar news of the cycle of living and dying. All through the last notes my mind swarms with images of a world in which the thermonuclear bombs have begun to explode, in New York and San Francisco, in Moscow and Leningrad, in Paris, in Paris, in Paris."

Eight of the 24 essays are wholly or

essentially concerned with nuclear holocaust. It makes heavy going, and the result, for this reader, is despair. Not despair over the no-win nuclear end game mankind is playing out—any rational person must already have despaired of that—but over the darking down of one of the leading lights of modern letters. Dr. Thomas has arrived at the heart of our dilemma—the certain knowledge that events are out of our hands—but declines to use the ruses that keep the rest of us going, such as repressing the logical conclusion to which nuclear thinking leads, or simply refusing to think about it. But he sheds no new light on the subject, just glares at it.

Pollyanna gets a bad press, but there is sanity in being determined to brighten the corner where you are. We're all in the *same* corner, and if we could not pretend that there will be a tomorrow we should be hunched and howling like Bedlamites. Perhaps there is light at the end of this long and awful tunnel, perhaps not. But we must get up in the morning; we must do our work; we must raise our children and tend our sick; we must laugh and we must play.

It is dismal affirmation of the need for this "work-hope-and-be-merry" approach that even so thoughtful a man as Thomas has been able to come up with no better proposal for caging the thermonuclear dragon than an exchange of hostages. It may be significant that Thomas seems to have lost heart just about the time his heart went bad on him. In the essay "My Magical Metronome" he apologizes for his electronic pacemaker:

"I have been critical of what I called 'halfway technologies,' designed to shore things up and keep flawed organs functioning beyond their appointed time. And here I am, enjoying precisely this sort of technology, eating my words."

Lovers of the language will be glad that Thomas is still able to eat his words, and better yet, to write more of them. While *Late Night Thoughts* begins and ends and is shot through with shrill essays on the bomb, it is leavened with the sparely elegant prose, puckish viewpoints and erudite philological discursions that made his earlier collections so delightful. He cannot be resisted when he muses over such things as the bacteria recently discovered thriving in the superheated water that spews from undersea open vents and which "can be killed only by chilling them down in boiling water."

Thomas describes himself as a meliorist; I hope he'll be feeling better next time out. We need more of his vignettes of this mysterious world:

"Bees are filled with astonishments, confounding anyone who studies them, producing volumes of anecdotes. A lady of our acquaintance visited her sister, who raised honeybees in northern California. They left their car on a side road, suited up in protective gear, and walked across the fields to have a look at the hives. For reasons unknown, the bees were in a furious mood that afternoon, attacking in platoons, settling on them from all sides. Let us walk away slowly, advised the beekeeper sister, they'll give

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it up sooner or later. They walked until bee-free, then circled the fields and went back to the car, and found the bees there, waiting for them."

*Hank Burchard*

Staff writer, *Washington Post*

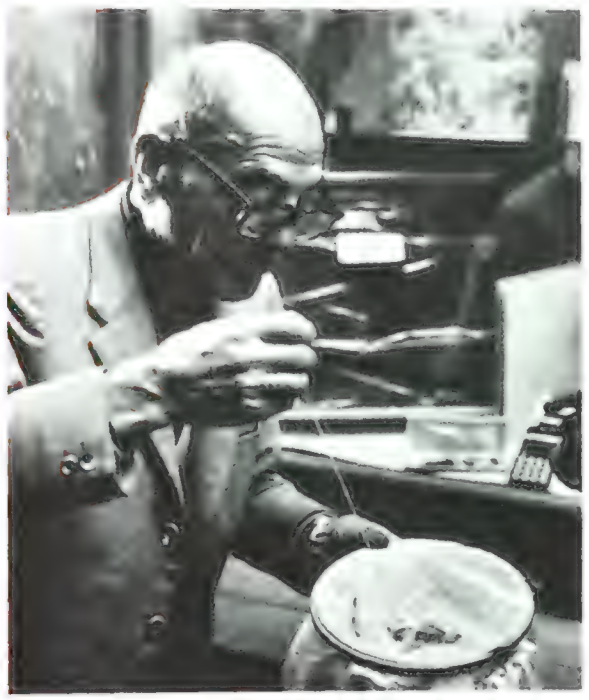
*My Last Sigh*

Luis Buñuel, translated by Abigail Israel

Knopf, $15.95

It is close to 30 years since I saw Luis Buñuel's film *The Adventures of Robinson Crusoe*, but one image remains vivid in my mind. Needing a scarecrow, Crusoe finds a dress in the stores he has salvaged from the wrecked ship and raises it on crossed sticks above his garden. As he admires his handiwork, a breeze suddenly animates the cloth. The shot of the dress, bodied out by wind and imagination, says more about loneliness and desire than the best lyric poem can manage, and it has a continuing force—with me, at least—far stronger than the more lurid images that, from *Un Chien andalou* (1928) to *That Obscure Object of Desire* (1977), have brought both praise and obloquy on Buñuel's head.

It is appropriate that the name Buñuel brings Crusoe's scarecrow to my mind since movies are the most fragmented of arts; everyone tends to remember his favorite film in terms of its best bits. "I'd kept a list of gags and ideas and images," Buñuel says, recounting how *L'Age d'or*



Director Buñuel takes a break during filming of *That Obscure Object of Desire*.

began to take shape. *Take shape* for a Surrealist film? Of course, because ideally in any film, whatever its ideological allegiance, the parts come together to form an esthetic, an intellectual or an emotional whole.

"As with all my films, it began with an image," Buñuel once said of *Viridiana*, "then the rest of the film flowed quite naturally from there." The nature of that flow, undefined in the *Le Monde* interview from which the quotation comes, can be guessed from various scattered remarks in *My Last Sigh*—comments on the thematic intentions of a film or the centrality of character (*El* as "simply the portrait of a paranoiac") or the value of plot ("The essential thing about a script is, in the last analysis, suspense—the talent for developing a plot so effectively that the spectator's mind doesn't wander for even a moment.").

Yet Buñuel returns again and again to images—the mysterious box that frightens the prostitutes in *Belle de jour*, the unexplained bag Fernando Rey carries away in *That Obscure Object of Desire*—which defy analysis, reflect his continuing fondness for the irrational, and cause the spectator's mind not only to wander but to shoot off into imaginative realms of its own. Among celebrated movie directors, Buñuel is the one that I remember most vividly as a "thing of gags and patches"—often outrageous gags, famously disturbing patches.

As with his films, so with his "semiautobiography," as he calls *My Last Sigh*—the mixture of memory and mismemory that he put together with the help of Jean-Claude Carrière, who worked with him on the scripts of his French films beginning with *Diary of a Chambermaid* (1964). "Our imagination, and our dreams, are forever invading our memories. . . . Of course, fantasy and reality are equally personal, and equally felt, so their confusion is a matter of only relative importance."

The book is a mosaic of bits and pieces. There is a chronology which carries Buñuel from his comfortable childhood in Saragossa and Calanda to his last years when his deafness emphasized an attraction to isolation he always had. "Time passes and nothing changes; everyone lives inside himself. There are no journeys to take." Interspersed with the autobiographical chapters are ruminations on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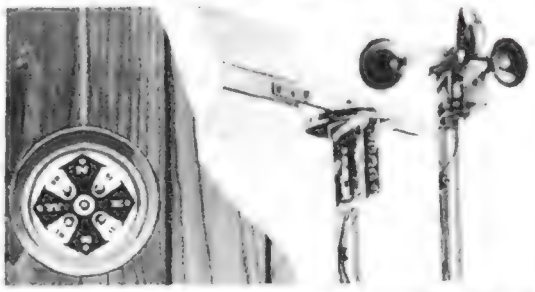

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**"ESCAPE from the ordinary."**

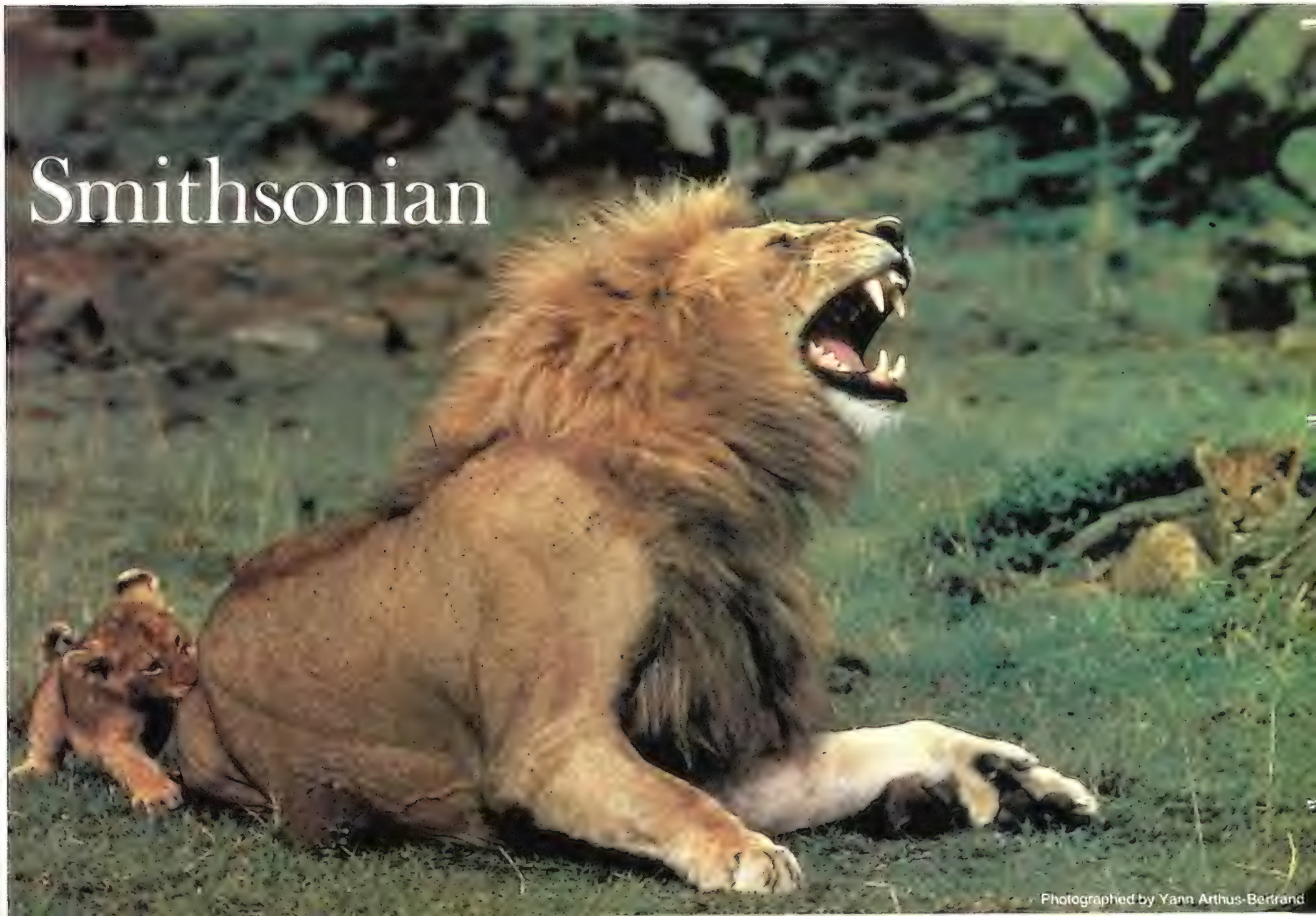
memory, the pleasures of tobacco and drink, dreams, likes and dislikes—obvious containers for unanchored anecdotes, floating opinions.

All through the book the chronology is disrupted by parentheses, and the account of his student years in Madrid, his adventures among the Surrealists in Paris, his work during the Spanish Civil War, and his career as a director in Mexico, Spain and France is not a narrative but a collection of memories, stories, allusions—some pointless, some revelatory—often no more than a sentence or a paragraph long, brought together almost by accident. In the midst of his pages on his apprentice work with Jean Epstein on *Mauprat* and *The Fall of the House of Usher*, he says, "I remember, too, meeting and having coffee with the legendary Maurice Maeterlinck," but he says nothing about the meeting except that Maeterlinck was "quite old" (he would have been 64 at the time) and, since the Belgian poet plays no part in Buñuel's life, the apparently gratuitous remark is presumably there only because the memory surfaced as he worked on the book. It might serve as an example of how *My Last Sigh* was constructed, and yet the often disparate pieces add up to a sense of what it was like among the artists and writers in Madrid right after World War I or among the Surrealists in Paris at the end of the 1920s.

Much of *My Last Sigh* is about the making of movies, but it is not a book for the film scholar, who will have to pick through the text in search of details of production, which should be checked against other sources, and insights into individual films, which need be measured only against the movies themselves. "I don't think a life can be confused with a work," Buñuel says, and the pleasure of his autobiography is that the man sits among his fragments, his "multiple contradictions," and conveys a strong sense of his idiosyncratic personality.

In the chapter on the Civil War, describing the chaos of the nightly meetings of the Association of Writers and Artists for the Revolution, he says, "As usual, I was torn between my intellectual (and emotional) attraction to anarchy and my fundamental need for order and peace." Similar conflicts run all through the book. A kind of primness fights his desire, as a Surrealist, to commit outrageous public acts. His sympathy with anarchism makes him admire in the abstract violence which disgusts him in fact. A gentle and reasonably chaste man, he filled his movies with cruel and erotic images that gave him a public reputation ill-suited to the voice that we hear all through the biography. It is that voice that makes *My Last Sigh* so fascinating.

In the final section of the book, Buñuel contemplates old age and death. "As I drift toward my last sigh, I often imagine a final joke," he says, one in which he calls together "my friends who are confirmed atheists, as I am," and stages a deathbed conversion. The autobiography was originally to be called *My Last Breath* in English, but someone at Knopf must have got nervous about that title and taken refuge in the fact that *soupir* means both "breath" and "sigh." Sighing does not quite suit the Buñuel we meet here,

and although there is no deathbed conversion, he does draw his friends around him. Since he died just before the book was published, I will continue to think of it as *My Last Breath.*

*Gerald Weales*
Professor of English
University of Pennsylvania

*The Encyclopedia of American Crime*
Carl Sifakis
Facts On File, $49.95/$17.95, paper

It is hard to know whether this is a reference book or a blunt instrument. Certainly, with its 802 oversize pages chockablock with violence and gore, it bluntly assaults the senses of the unwary reader. But then, who is likely to go to its pages if not those expecting to meet up with the unsavory likes of Jesse James, Al Capone and Ma Barker? Even the timid, though, who regularly shun lurid newspaper accounts of crime, would have to have attended no movies, seen no television, read no fiction not to find much in *The Encyclopedia of American Crime* passing familiar. The police blotters of yesterday are the entertainment of today, as it were.

Carl Sifakis, a crime reporter, doesn't waste space romanticizing crime or criminals, nor does he go in much for sympathetic sociology. A specialist immersed in his subject, he yet reveals no sneaking admiration for any of the antisocial types whose lives he chronicles. It's "just the facts, ma'am," as *Dragnet*'s Sgt. Joe Friday used to say, and they are by and large pretty repugnant.

On occasion, when Sifakis does assert himself editorially, it is to correct historical misapprehensions, to set the record straight, as in the case of Martha Jane Cannary, a.k.a. Calamity Jane, or of murderess Barbara Graham. The former, it seems, was not the rootin', tootin', hardshootin' heroine of Wild West mythology but rather a sometime prostitute and full-time alcoholic, while the latter (whose story was turned into a popular 1950s movie tearjerker and, more recently, a TV film) was no victim of the system but was instead, says Sifakis, a callous killer.

It is such surprises that give flavor to what might otherwise be a fairly complete and basically standard compendium of gangsters, madams, hit-men, safecrackers, rogue cops, rustlers, hanging judges and the like. And, of course, there are the hundreds of little-known and eccentric criminals, long gone and long forgotten, whose exploits take up the slack between the "celebrity" entries. Again, if you are not too squeamish, this is where the book's true fascination for the casual browser lies—in the accounts of Ah Hoon, the Chinatown stage comic whose satiric attacks on the rival tong brought about his demise; of Ida the Goose, for love of whom a New York gang war broke out in 1909; of John Miller, a 19th-century "one-armed brute with a chain and iron ball attached to the stump that was left of his other arm." You've heard of Miss Piggy, no doubt, but what about Miss Piggott, who in the 1860s and '70s was a saloonkeeper on San Francisco's infamous Barbary Coast and gave her name to a knockout concoction—precursor of the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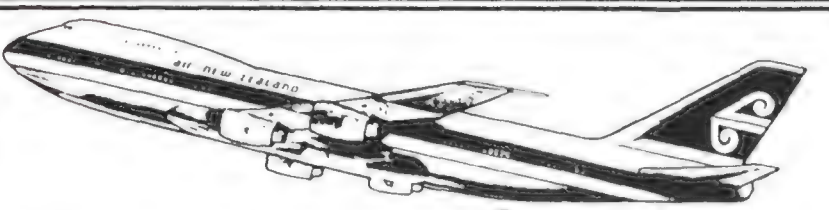


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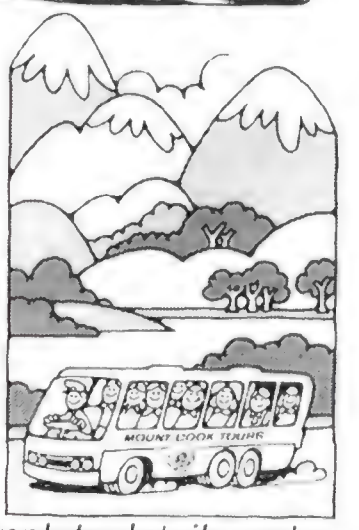


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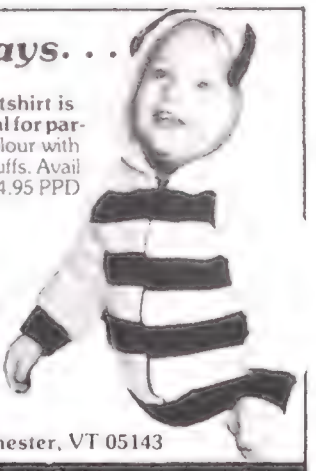

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"Mickey Finn"—first served to the unsuspecting at her establishment? For that matter, did you know that Lizzie Borden left the bulk of her estate to the Animal Rescue Leagues of Fall River, Massachusetts, and Washington, D.C.?

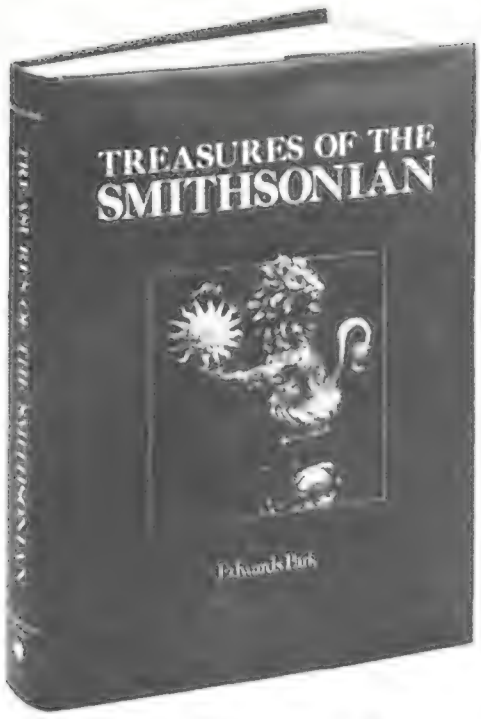
Obviously, Sifakis' topic lends itself readily to colorful writing, and he does not neglect the etymology of crime's vocabulary, pausing to explain "Black Maria," "bushwhacker" and other bits of our language with criminous origins.

One can understand Sifakis' need thus to quantify his findings and place them in some perspective, but the eventual effect of this approach leads to a measure of reader skepticism. We have to accept his "highly selective" weeding-out, but after all, he himself points out that he was limited to 2,000 entries covering everything from Presidential assassination to punishment for scolds. (With Watergate thrown in, for good measure: amidst thugs and murderers and child molesters, the appearance of Deep Throat, "the most famous informer in U.S. history," comes as a shock.) Yet there are, he continues, 20,000 or more recorded *murders* alone each year in this country. Did he really get the "best" with the "most"? Among the missing are Jean Harris and Ted Bundy, to name just two; both these rather notorious convicted murderers have had much ink devoted to them, but failed to make the cut. John Hinckley, however, has been squeezed in. Sacco and Vanzetti are included among the "causes célèbres" while the Rosenbergs are not. Nat Turner is here but John Brown is not, and a "pornographic" painting titled *September Morn* gets an entry while literary targets of the censors, like *Ulysses*, *Lady Chatterley's Lover* and *Tropic of Cancer*, do not.

If there are any lessons to be taken from this alphabetically arranged history of the bad versus the good guys, it is that the lawmen and lawyers stand a better chance of dying in bed of old age. And if there is anything to be learned about our nation from *The Encyclopedia of American Crime*, it is that it has been a land of equal opportunity for the vice-ridden as well as the virtuous.

*Michele Slung*

Author of *Crime On Her Mind: Fifteen Stories of Female Sleuths from the Victorian Era to the Forties*

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P76


# *Additional reading*

**View from the castle** (p. 10)

*Court of the Teshoo Lama* by Captain Samuel Turner, W. Bulmer and Co. (London), 1806

*Views of Medieval Bhutan: The Diary and Drawings of Samuel Davis, 1783* by Michael Aris, Serindia Publications/ Smithsonian Institution Press, 1982

**Robots** (p. 60)

*Robots* by Jasia Reichardt, Viking Press, 1978

*A Walking Robot* by Ivan E. Sutherland, The Marcian Chronicles (Pittsburgh), 1983

*Robotics, Applications and Social Implications* by Robert Ayres and Steven M. Miller, Ballinger, 1983

**Pre-Raphaelites** (p. 72)

*The Pre-Raphaelites* by Christopher Wood, Viking Press, 1981

*The Pre-Raphaelites* by Timothy Hilton, Thames & Hudson, 1970

*The Pre-Raphaelite Landscape* by John Staley, Oxford University Press, 1973

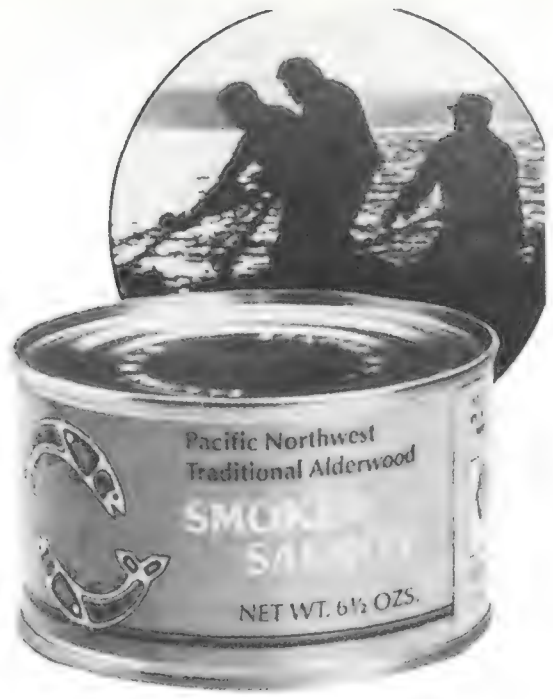
*The Paintings and Drawings of Dante Gabriel Rossetti 1828-1882: A Catalogue Raisonné* (two volumes) by Virginia Surtees, Clarendon Press, 1971

**Theodore Roosevelt** (p. 86)

*The Rise of Theodore Roosevelt* by Edmund Morris, Coward, McCann & Geoghegan, 1979

*Ranch Life and the Hunting-Trail* by Theodore Roosevelt, University of Nebraska Press, 1983 (reprint of 1888 edition)

*The Seven Worlds of Theodore Roosevelt* by Edward Wagenknecht, Longmans, Green (New York), 1958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Society Expeditions

*The Life and Times of Theodore Roosevelt* by William Henry Harbaugh, Oxford University Press, 1975

**Mules** (p. 98)

*The Modern Mule* by Paul and Betsy Hutchins, Hee Haw Book Service (Denton, Texas), 1978 (available from American Donkey & Mule Society, Route 5, Box 65, Denton, Texas 76201, $6)

*The Misunderstood Mule* by Walter L. Rickell, Reproductions West (Burbank), 1976 (available from American Donkey & Mule Society, $3.50)

*History of American Jacks and Mules* by Frank C. Mills, Helen L. Hall (Hutchinson, Kansas), 1971

*Wonders of Mules* by Sigmund A. Lavine and Vincent Scuro, Dodd, Mead, 1982

*Mules and Mississippi*, edited by Patti Carr Black, Mississippi Department of Archives and History, 1980

**Royal Warrants** (p. 112)

"A Short History of the Royal Warrant" by Betty Whittington, Royal Warrant Holders Association (RWHA), 1961

"The Royal Warrant: Rules to be observed by holders of the Royal Warrant to Tradesmen," published by order of the Lord Chamberlain, RWHA, January 1973

**Masks** (p. 131)

*Montgomery, Vermont* by W. B. Branthoover and Sara Taylor, Montgomery Historical Society, 1976

**University of Texas** (p. 140)

*The University of Texas: A Pictorial Account of Its First Century* by Margaret C. Berry, University of Texas Press, 1980

"Texas Recruits a Science Team" by Natalie Angier, *Discover*, January 1983

"Great Expectations" by Toni Mack, *Forbes*, March 15, 1982

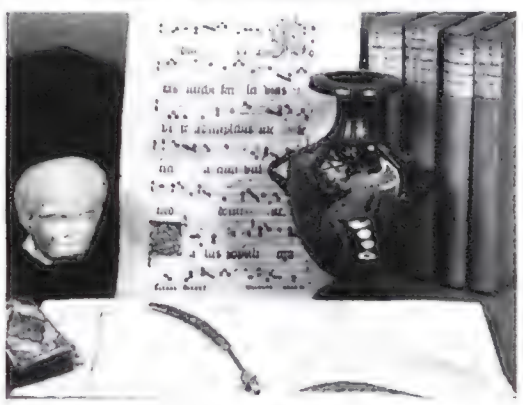
"Austin, Texas: Storehouse of British Culture" by Stewart McBride, *Christian Science Monitor*, February 5, 1981

**Volunteer firemen** (p. 154)

*Fire Engines, Firefighters* by Paul C. Ditzel, Crown, 1976

*The Volunteer Fire Company* by Ernest Earnest, Stein and Day/Scarborough, 1983

"Fire Loss in the United States During 1982" by Michael J. Karter jr., *Fire Journal*, September 1983



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Japanese photographs (p. 166)

*Japan Photographs 1854-1905* by Clark Worswick, Penwick/Knopf, 1979

*The Japanese Tattoo* by Donald Richie and Ian Baruma, Weatherhill (New York), 1980

*The Real Japan: Studies of Contemporary Japanese Manners, Morals, Administration, and Politics* by Sir Henry Norman, Scholarly Resources (Wilmington, Delaware), 1973

*The Samurai: A Military History* by S. R. Turnbull, Osprey Publishing (London), 1977

*The Chrysanthemum and the Butterfly* by Ruth Benedict, New American Library, 1974

**Butterflies** (p. 174)

"Found at Last: the Monarch's Winter Home" by Fred A. Urquhart, *National Geographic*, August 1976

"Monarch Migration" by Lincoln P. Brower, *Natural History*, June/July 1977

"A Visit with 200 Million Monarchs" by Jo Brewer, *Defenders*, April 1982

"Pattern of Eons Periled by Progress" by Robert A. Jones, *Los Angeles Times*, March 7, 1983

*Year of the Butterfly* by George Ordish, Scribner's, 1975

**Orvieto** (p. 184)

*Michelin Italy*, Michelin Tyre Co. Ltd. (London), 1973

*Umbria*, Touring Club Italiano (Milan), 1969

*Unknown Italy: The Cities of Central Italy* by Georges Pillement, Johnson (London), 1966

**Standard time** (p. 193)

"Standard and Daylight-saving Time" by Ian R. Bartky and Elizabeth Harrison, *Scientific American*, May 1979

*Greenwich Time and the Discovery of Longitude* by Derek Howse, Oxford University Press, 1980

*The Day of Two Noons* by Carlton J. Corliss, Association of American Railroads, 1956

"The Invention of Railroad Time" by Ian R. Bartky, *Railroad History*, Spring 1983

*The Beginning of the Long Dash: a history of timekeeping in Canada* by Malcolm M. Thomson, University of Toronto Press, 1978

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Society Expeditions

# *Smithsonian highlights*

A major new SITES exhibition, "The Precious Legacy: Judaic Treasures from the Czechoslovak State Collections," opens at NMNH on November 9. Drawn from one of the largest and most significant Judaica collections in the world, the 350 objects are leaving Czechoslovakia for the first time after negotiations that lasted a decade and a half. As with so much of history where the Nazis were involved, the creation of this magnificent collection has an almost unbelievable aura: most of the items were confiscated by the Nazis during World War II from Jewish synagogues and homes in Bohemia and Moravia while the objects' owners were being sent to concentration camps. The Nazis were planning a "museum of an extinct race." The exhibition runs through January 1, then will travel to Miami Beach, New York, San Diego, Detroit, Hartford.

A common Washington sight is people taking each other's picture in front of famous landmarks—the classic "I was here" statement. So it's fun to look through the nearly 300 paintings, prints and photographs in the exhibit at the National Museum of American Art, "The Capital Image: 1800-1915." Among those who posed for posterity was an unidentified mid-19th-century family, complete with faithful dog (p. 246), who chose the corner of the Capitol grounds where Greenough's berobed George Washington sat. (That statue is now in the Museum of American History.) Other paintings show a bucolic Georgetown College, Francis Scott Key's home on the Potomac (now the Whitehurst Freeway), and the broad swamp that is now our National Mall. The show runs through January 22, 1984.

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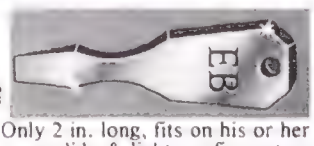


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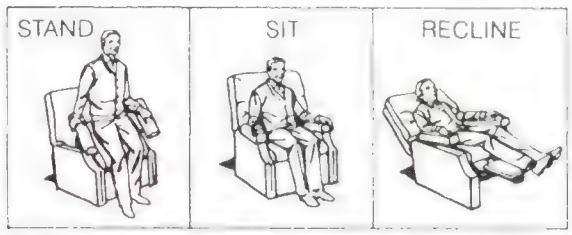


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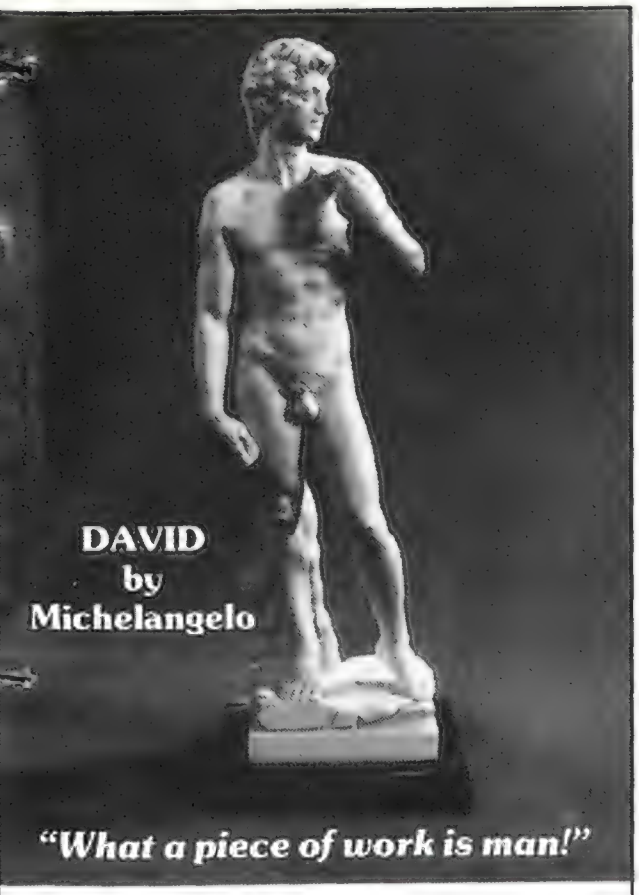


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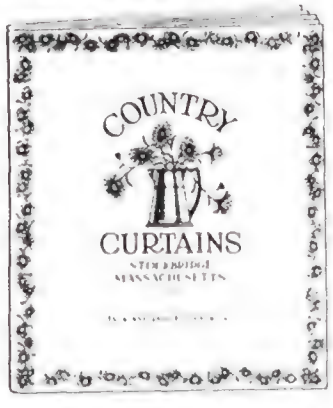


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*Flying the Concorde* (November 17; 7:30 P.M.) Concorde pilot Captain Colin C. Morris discusses supersonic flight.

**Cooper-Hewitt Museum** (New York)
*The Art of the European Goldsmith: Silver from the Schroder Collection* (November 1-January 22, 1984) Nearly 100 objects, most Renaissance and Mannerist.
*Michel de Klerk and the Amsterdam School* (November 1-February 5, 1984) Architectural drawings by 20th-century Dutch innovator.

**National Museum of Natural History**
*Ban Chiang: Discovery of a Lost Bronze Age* (November 2-January 31, 1984) Some 200 artifacts from northeastern Thailand site (see SMITHSONIAN, January 1983).
*The Precious Legacy: Judaic Treasures from the Czechoslovak State Collections* (November 9-January 1, 1984) More than 350 objects from the State Jewish Museum in Prague.
*The Mindful Way* and *Bangkok: A Special Time and Place* (November 4; noon) Two films on a Thai monastery and Bangkok's 200th anniversary.
*Prague's 1000 Years of Judaism* and *The Remnant*, Part I (November 25; noon) Films shown in conjunction with *The Precious Legacy* exhibition.

**Anacostia Neighborhood Museum**
*Through Their Eyes: The Art of Lou and Di Stovall* (through December 18)—Retrospective includes 84 works.

**Freer Gallery of Art**
*Studies in Connoisseurship, 1923-1983* (through February 29, 1984) How scholars have reassessed 60 works in the museum's collection.
*Transitional Blue-and-White: Some Reflections on Style* (November 8; 8:30 P.M.) Lecture by Margaret Medley, curator, Sir Percival David Foundation, London.

**National Portrait Gallery**
*Masterpieces from Versailles: Three Centuries of French Portraiture* (November 11-January 8, 1984) Special loan exhibition.
*Muses in the New World, Part II* (November 4, 7:30 P.M.; November 5, 1:30 P.M.) Portraits in Motion presents music of Aaron Copland and others, sung by Kathie Gaus-Woollen.

**National Museum of African Art**
*African Islam* (November 30-April 22, 1984) More than 100 objects from 19th and 20th centuries.

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(through November 27) Works by Archipenko, Brancusi, Noguchi and others from the museum's collection.

**Renwick Gallery**
*Russel Wright: American Designer* (November 4-March 4, 1984) Some 250 examples of furniture, flatware, ceramics, glassware and fabrics created by this innovator.
*Clay for Walls* (through June 17, 1984) Wall-mounted ceramic works by 20 contemporary artists.

**National Museum of American History**
M*A*S*H: *Binding Up the Wounds* (through September 30, 1984).

**National Museum of American Art**
*The Capital Image: Painters in Washington, 1800-1915* (through January 22, 1984). Gilbert Stuart, Emanuel Leutze, others.

## Smithsonian events

For price information and tickets to Resident Associate events, call 357-3030:
*Roman Rulers: Shapers of Empire* (November 5) All-day seminar with classical historian William MacDonald.
*"La Vie de Château": The Triumph of French Taste* (November 12) All-day seminar on life of the privileged during the ancien régime.
*Symbols in Fashion Design: A Day with Mary McFadden* (November 19) Lectures, slides, discussion with top designer.
*Versailles: The Reign of Fame* (November 22; 8 P.M.) Slide lecture with music and narration by Albert Fuller.
*Berlin Alexanderplatz: A Film Marathon* (December 3-4) Marathon weekend showing of Rainer Werner Fassbinder's 15½-hour film about decaying 1929 Berlin.

## Smithsonian on the air

*Radio Smithsonian*: Features on this weekly half-hour program include a musical tour of America's big-band era and a visit to the back alleys of Baltimore, tracking the common cat.
*Here at the Smithsonian . . .*: Two-minute features present brief takes on activities at the Smithsonian.
*Smithsonian Galaxy*: Short radio spots explore intriguing aspects of history, art, science.

To find out what stations in your area carry these radio and TV programs write: Office of Telecommunications, MNH Room C222B, Washington, D.C. 20560.

## Contributing Membership Program

The Contributing Membership Program supports the Smithsonian's research and educational activities through annual membership contributions in five categories: Supporting, $50; Donor, $100; Sponsoring, $250; Sustaining, $500; and Patron, $1,000. (Contributions are tax-deductible within legal limits.) In addition to all benefits of Smithsonian Asso-

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ciates, Contributing Members attend elegant evening previews of museum exhibitions; are given behind-the-scenes museum tours; and receive a special edition of a richly illustrated Smithsonian publication and the Smithsonian Engagement Calendar. For further information, please contact the Contributing Membership Program, A&I 1190A, Smithsonian, Washington, D.C. 20560.

### Exhibition catalogs

Catalogs available at this time are:
*The Precious Legacy: Judaic Treasures from the Czechoslovak State Collections* ($40.95 cloth; $16.95 paper); extensive text and color illustrations.
*Russel Wright: American Designer* ($15); 50 illustrations.
*Ban Chiang: Discovery of a Lost Bronze Age* ($9.95); extensive illustrations.
*The Capital Image: Washington Painters, 1800-1915* ($27.50); text, illustrations.

To order, send check or money order to: Museum Shops, Box 44083, Washington, D.C. 20066-0083. Include either 15 percent of total purchase or a minimum of $1.75 to cover postage and handling.

### Smithsonian Institution Traveling Exhibition Service

SITES circulates exhibitions to hundreds of cities outside Washington. To sponsor a show in your community, write: SITES, Smithsonian, Washington, D.C. 20560. Here are some November exhibits:
Fresno, California (November 3-January 1, 1984) *Raphael Soyer: 65 Years of Printmaking, Selections,* Fresno Art Center.
Bloomingdale, Illinois (November 12-December 11) *Beauties of the Coral Reef,* Bloomingdale Park District Museum.
Baton Rouge (November 5-December 25) *English Naive Paintings,* Louisiana Arts & Science Center.
Albuquerque (November 19-March 25, 1984) *Images of Old Age in America,* New Mexico Humanities Council.

### Membership benefits

A pre-visit packet, filled with helpful information for Associates planning to visit the Smithsonian, is free; send postcard request or phone Associates' Reception Center, Smithsonian Institution, Washington, D.C. 20560 (202) 357-2700; for hearing impaired, TDD (202) 357-1729.

Begin your visit at the Associates' Reception Desk in the castle, where a cordial welcome and special printed materials await you, 10 A.M. to 4 P.M. daily. Other benefits: a half-hour slide/lecture orientation to the 13 museums; dining in The Court; discounts in Smithsonian shops.


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# Seekers of the long shot

*Carrying rockets on their shoulders and liquid fuel in old coffeepots, they achieved a dream against the odds*

For most people, the 1929 cover of *Science Wonder Quarterly* was fun to think about but surely impossible. Respected scientists around the world pontificated that it could never happen—there were too many technological barriers.

Enter the rocket "nerds"—forerunners of today's computer nerds—visionary and occasionally fanatical scientists and hobbyists in the United States, Germany, Russia and elsewhere who all shared the same goal: the conquest of space. Through the 1920s and '30s they persevered, often with the slimmest of means: members of the American Rocket Society (ARS), for example, worked out of a garage in a field near Stockton, New Jersey, pouring liquid fuel into the rocket's tank with an old coffeepot and leaping behind a jerry-built sandbag wall to view takeoffs. At roughly the same time over in Berlin-Rienickendorf, Germany, a 19-year-old named Wernher von Braun (opposite) was doing much the same thing: slinging rockets over his shoulder and carrying them out to a launch pad in a field.

The history of these rocketry pioneers has been chronicled for the first time in a new book from Smithsonian Institution Press, *Prelude to the Space Age: The Rocket Societies, 1924-1940*. It was researched and written by NASM historian Frank Winter, who also offers fascinating insights into the gradual shift of public opinion away from skepticism. Popular media had a big impact. In this country, readers flocked to sci-fi periodicals, such as Hugo Gernsback's *Science Wonder Quarterly*, while in Germany converts were won by Fritz Lang's 1929 movie *Frau im Mond* (Woman on the Moon), which was the first to use scientific advisers during filming.

By the late 1930s, people weren't laughing at the societies any more. And many scientists who had feared being associated with "crackpot" ideas a mere decade earlier were wondering how they had missed the ship.

*Constance Bond*

Cover of Hugo Gernsback's sci-fi pulp portrays "crackpot" space-flight dream.

In a chilly New Jersey garage in 1932, ARS members ready a rocket for launch.

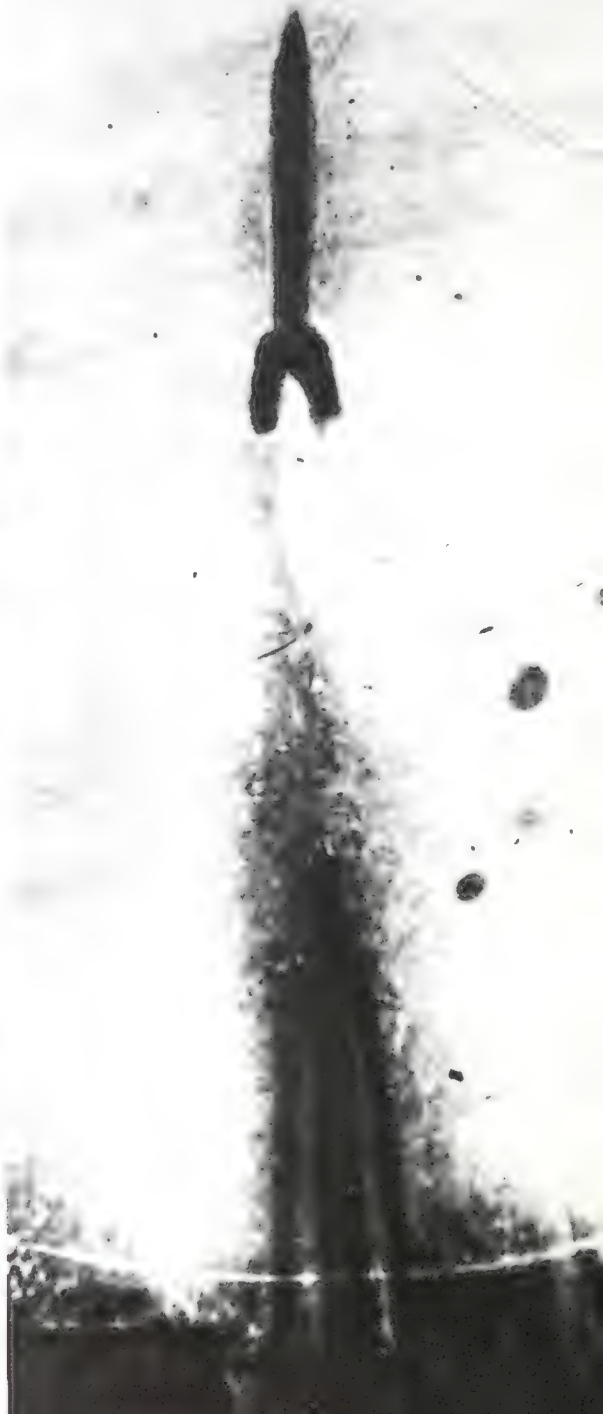
Fritz Lang's 1929 movie, *Frau im Mond* (Woman on the Moon), was the first to use scientific advisers, and helped convince skeptics that space flight was possible.

ARS pioneers pour liquid oxygen into coffeepot they used to fill rocket tank.

For the launch, two ARS founders crouch behind sandbags with a camera.

Crackpots come of age: here, a successful launch of Soviet GIRD 09 rocket, 1933.

In Germany, 1932, a teen-age Wernher von Braun carries a rocket to launch pad.



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*As a Smithsonian Associate, you can enjoy the benefit of culturally oriented experiences under the guidance of museum curators or visiting scholars. Your lively curiosity and broad interests have resulted in a comprehensive study program to meet many tastes and budgets.*

## Domestic Study Tours

**Florida Keys and Everglades** December 3-10· An outdoor adventure, featuring a day trip to Dry Tortuga and canoeing in the Everglades' rivers and lakes.

**Christmas at the Smithsonian** December 9-11: Welcome the holidays with a gala tree-trimming party in the castle and special tours of the museums.

**Hawaii** January 29-February 11 or February 26-March 10: Hike and camp in the more secluded areas on three of these enchanted Pacific islands.

**Yellowstone in Snow** February 17-26: Ski across landscapes blanketed in stillness for a close view of wintering elk and steaming geysers.

**Baja Whale Watch** February 19-27: Board the *Royal Polaris* for an unforgettable journey to Baja California to watch the migration of the gray whale.

**Puerto Rico** February 20-29: Travel to remote tropical forests to see colorful bird life, waterfalls and exotic flora.

**Savannah and Charleston** March 22-29 or April 8-15: Experience the gracious living of the past in charming seaports with their elegant townhouses, fine antiques and cobblestone streets.

**Okefenokee** April 8-14: Canoe through this beautiful wildlife refuge with moss-draped cypress trees and an array of springtime flowers and birds.

**The Civil War in Virginia** May 3-11: From Richmond to the Shenandoahs, visit major battle sites of the eastern campaigns.

**Arches and Canyonlands National Parks** May 10-17 or September 20-27: Hike through Utah's incredible landscapes on this sequel to our Bryce and Zion trip.

**Kentucky** May 17-25: Visit historic homes in Louisville, Lexington, and Shakertown plus renowned craft centers in Berea.

**Crow Canyon Archaeology** May 20-27 or August 5-12: Join archaeologists near Mesa Verde, Colorado, for a dig at an ancient Indian site.

Upcoming trips include a Mississippi River cruise aboard the *Delta Queen*, a land and boat trip to Alaska, and a literary tour of California.

**Washington "Anytime Weekend":** Brighten your winter with an economical weekend visit to your choice of Smithsonian museums. Package includes hotel, meals, sightseeing and exclusive tour of Smithsonian castle. Reservation and payment must be received at least ten days prior to arrival.

## Foreign Study Tours

These tours range in size from small group experiences to charter adventures and vary in price from low cost to deluxe, depending on the type of travel, destination and length of trip:

**People's Republic of China, 1984:** Retrace the Silk Route, climb China's sacred peaks, cruise the Grand Canal or Yangtze River, explore back roads, study decorative arts and antiques, or journey by train through the countryside. Exclusive tours are led by a Sinologist and include intensive pre-tour briefing.

**Mexico City and El Tajin** January 12-24: With a Mesoamerican anthropologist, discover the rich archaeology and important museums in and around Mexico City, Puebla and seldom-visited sites of the Veracruz coastal plains.

**Thailand and Burma** January 20-February 10: Colorful cities, remote villages of the hill-tribe people, and historic sites will capture the splendor of Asia's most exotic countries.

**India and Sri Lanka** January 22-February 12: Combine a land trip to Delhi, Agra, Jaipur and Udaipur in northern India with a voyage around the Indian subcontinent on the *Illiria*. Explore the country's fascinating cultural contrasts with study leaders and local speakers.

**Zapotec and Mayan Mexico** February 9-21 or March 8-20: Study native cultures—past and present—in Oaxaca, San Cristóbal de las Casas and the Yucatán.

**Morocco** March 8-24: Explore the exotic imperial cities of Marrakesh, Fez, Rabat and Meknès and the powerful beauty of historic desert and mountain villages.

**Ancient Civilizations** March 11-31: A unique study voyage aboard the *Argonaut* traces the development of Western civilization. Begin in Cairo, then travel to historic sites along the Nile, in Jordan and Israel, before stopping in Santorini, Crete and Athens.

**Rouen and the Norman Countryside** March 31-April 15 or October 6-21: The ancient city of Rouen, capital of lush Normandy, provides a superb setting for walking tours, museum visits and special excursions nearby, including Norman churches, elegant beach resorts and Monet's Giverny.

**Canals and Old Masters** April 10-24: Art museums, historic tours and spring flowers highlight four days in Amsterdam. Then sail by riverboat to explore the cobbled streets of medieval Dutch and Belgium port cities, plus Brussels.

**London and the English Countryside** April 29-May 13: A full program of special lectures, walking tours, theater, excursions and a five-day countryside travel seminar.

**Springtime in Greece** May 4-19: A full program in Athens is followed by visits to the renowned sites of ancient civilizations when the countryside is a paradise of wild flowers.

**History and Romance of the Rhine** May 14-29: Following a program in Zurich and Basel, embark on our chartered ship for a seven-day study voyage to the great castles and cathedrals on the Rhine.

**Swiss Countryside** May 26-June 10 or September 1-16: Explore the majestic, romantic mountain world of Switzerland's Bernese Oberland.

**Write National Associates, A&I 1278 Smithsonian Institution, Washington, D.C. 20560 or call (202) 357-2477 for specific tour brochures**

# in Washington

## Selected Studies Seminars

Enjoy the treasures of the Smithsonian in unique, popular programs and special behind-the-scenes tours. Choose from:

**Quilted Clothing** November 6-11: Design and make a smashing one-of-a-kind quilted jacket from start to finish with warm and witty author Virginia Avery. Includes specially arranged tours of the Smithsonian's fine quilt collection and a designer fashion show.

**Irresistible Magazine Writing** November 13-18: Edwards Park, along with other experts from *Smithsonian* and *National Geographic* magazines, shares the secrets of dynamic writing—whether it be for magazines, newspapers, annual reports, or a letter asking for a raise or proposing marriage.

**Masters of American Painting** January 29-February 3: Popular lecturer William Kloss focuses on the great works of favorite artists. Includes in-depth tours of the unprecedented and memorable exhibition of more than 100 masterpieces, "A New World: American Painting from 1760-1900," organized by the Boston Museum of Fine Arts at the request of the Louvre.

**French Impressionist Painting** March 4-9: Lectures and tours with William Kloss of the many masterpieces by Monet, Degas, Renoir and others in Washington's art museums.

**Connoisseurship of Rugs** April 8-13: Experts present masterpieces from the distinguished collection of 1,000 rugs from virtually every region of the world at the Textile Museum and use color slides of other fine museum and private collections to explore the many rich designs and techniques of the major rug traditions. Includes special exhibitions, care and repair of rugs, and a round-table discussion of participants' rugs.

**Gardens by Design** April 29-May 4: The Director of the Smithsonian's Office of Horticulture and other experts focus on the art of planning and designing private and public gardens of all sizes. Visits to renowned historic properties, private estate gardens, botanic collections and modern greenhouses afford unlimited opportunities to visually relate successful examples to personal projects.

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*Placed in the National Register of Historic Places by the United States Government.*

*By Richard Wolkomir*

# *If the interstellar hot line rings, who gets the message?*

I have a plea for Drs. Carl Sagan and Paul Horowitz: Please, gentlemen, stop before it's too late!

The Planetary Society, which Dr. Sagan cofounded, has refurbished an old radio telescope at Harvard University. And physicist Paul Horowitz is using that telescope right now to scan the skies for a message from THEM.

It's not that we Earthlings are unneighborly, precisely. It's just that some of us, contemplating the cosmos, with its myriad stars and galaxies, get the willies. What if THEY actually do give Dr. Horowitz a buzz? What then?

Scientists in Carl Sagan's camp have long argued that—unless our little plain-Jane solar system is unique—billions of stars must have planets. A percentage of those planets, the theory goes, will have life. And a percentage of those life forms will have evolved into beings bright enough to invent radio telescopes, Cuisinarts, mulching lawn mowers and other such appurtenances of a highly advanced civilization.

Such civilizations, the scientists estimate, could number a million. And they believe that at least some of them are beaming this message into the void: "We're here. Are you?"

Skeptics have asked why aliens would want to ring us up. After all, we're not dialing *them.* An advanced civilization would have so much power at its disposal that this could be just a Cub Scout project, Sagan has suggested.

Extraterrestrial Cub Scouts are mildly reassuring, but the notion of alien megapowers inclines me to crawl under the bed. What if, expecting E.T., we should find that we've reached out and touched Darth Vader? Alien fleets could simply roar into overdrive, streak through space and be here in time to sizzle the planet before cocktails.

Enthusiasts argue that any truly obnoxious civilization, at some point in its technological development, would nuke itself into molecules, which casts a certain pall over our own prospects. That being the case, it is comfortingly unlikely that any extraterrestrial Golden Horde will thunder down in hyperdrive to pillage our Stop & Shops. But there are problems.

For one thing, if we do receive a message from the stars, and somehow manage to translate it, we may turn into cosmic wallflowers, self-condemned to an eternity of sheepishness. Man has always been pretty chesty about his skills and possibilities. How will our collective self-esteem stand up to a message from Beyond sneering something like, "Uncle Miltie, indeed—you yo-yos!"

Such a curt note is possible. Carl Sagan himself has pointed out that we inadvertently began signaling to extraterrestrial civilizations in the early days of radio. Our video transmissions have also been streaming toward the stars, with shows of the 1950s starting to beam in on them just about now.

What if THEY have tuned in? As Joseph Conrad once wrote, in a different context, "The horror! The horror!" Imagine the great thinkers of planets around Aldebaran or Procyon turning up their eyestalks in dismay as they contemplate Lucy goofing around with Desi. How would they interpret Road Runner cartoons? Yogi Bear? Would Howdy Doody give them the idea that our race is actually descended from maple trees? Analyzing Sid Caesar and Imogene Coca, would they conclude that the most typical human activity is to smash scenery? But the killer would be the Huntley-Brinkley Report on the news: Ike swatting golf balls, the Cuban missile crisis, Hula Hoop contests—surely they would have the Earth cordoned off. And when the video wares from today finally reach the interstellar confederations, and better minds than ours for the first time must decide who shot J.R., they may opt to send in a crack psychiatric team to administer global therapy.

Another possibility: the great day comes and our interstellar hot line rings . . . but we can't figure out the message. It may be the secret of existence, or it may be an advertisement for Betelgeusian water beds. What with all the chatter about mediocre education, the sheer frustration might put us into a permanent funk. What if we find out just enough to know we are too dim-witted to qualify for the galactic chapter of Mensa?

We species chauvinists who always consider the universe a stage set for our little comedy, with other life forms cast as walk-ons, would we brood petulantly, refusing to think up new, improved anti-antimissile missiles and still newer kinds of dandruff shampoo?

Or suppose that we never hear a signal. Would that really mean that *we're it*? All there is of intelligence in the expanding universe? The race that invented artificial lemonade? Somehow, that prospect is especially glum.

Now consider the worst possibility: two weeks after we pick up interstellar signals, everyone loses interest and goes back to watching *The Dukes of Hazzard.* Could we manage to survive knowing *that* about ourselves?

Gentlemen, please! Hang up the phone before it's too late!

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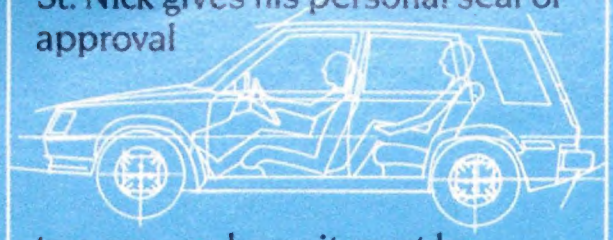
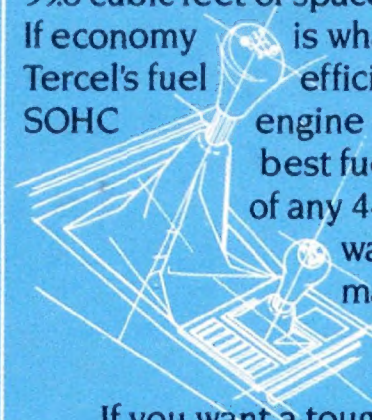


to a car, you know it must be something to say ho ho ho about. Santa's a man with tough requirements. That's why he chose the Tercel 4WD Wagon. The sleigh is fine for Christmas Eve, but for the rest of the year he needs something more practical. He needs a car roomy enough to carry feed for all his reindeer, yet economical and dependable to pull through treacherous roadways.

If the Tercel 4WD Wagon can fit needs as demanding as Santa's, just think how easily it can accommodate you. If room is what you want, stretch out. No small 4WD wagon can match its roominess. The roof line is higher than any other small wagon, for more headroom. And there's a panoramic rear window for more visibility. Five people can sit comfortably with lots of space for gear in the carpeted cargo area. And if you want more luggage space, just fold down the rear seat backs and get 59.8 cubic feet of space.



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OH WHAT A FEELING!
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APPROVED BY SANTA CLAUS

Is the Tercel 4WD Wagon for you? Just ask Santa.

*Remember: Compare this estimate to the "EPA Estimated MPG" of other cars with manual transmission. You may get different mileage, depending on how fast you drive, weather conditions and trip length. Actual highway mileage will probably be less than the "Highway Estimate."
**Optional chassis gravel shields recommended for rough road use.

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